

Chapter I. Educational Attainment Data Improve Occupational Analyses

Over the past decade, BLS has identified the most significant single source of postsecondary education or training for each occupation for which employment projections are estimated. Although this classification system is an important source of career advice for individual occupations, the practice of aggregating data within categories results in misleading information about the educational requirements of projected employment growth. Newly developed educational attainment data address this problem. This chapter of *Occupational Projections and Training Data* introduces a new analytical product that describes the educational attainment distribution of 25- to 44-year-olds in each of the 725 occupations for which employment projections have been estimated for the 2002–12 period. For each occupation, the percentages of employees aged 25 to 44 years with a high school degree or less, with some college (including, but not limited to, recipients of associate degrees), and with at least a bachelor's degree are presented.¹ The estimates are based on data drawn from the Current Population Survey (CPS) over 2000–02. These data provide important information that complements the most significant single source of postsecondary education or training assigned by BLS analysts to each occupation.

The data on the educational attainment distribution of occupations also are used to identify education clusters of occupations that provide a natural hierarchical sorting of those occupations that reflects increasing levels of skill, education, and training. These clusters are used to construct estimates of the number of projected jobs that will be filled by those with a high school diploma or less, those with some college, and those with a bachelor's degree or higher. In addition, the clusters are used to develop lists of high-wage, high-demand occupations for the 2002–12 projection period.

Addressing the need for information about occupational educational attainment

BLS identifies 11 education and training categories that describe, for each occupation, the most significant postsecondary education or training pathway to employment in that occupation. To assign occupations to these categories, BLS economists acquire a considerable body of knowledge about occupations and industries based on data from both the Bureau itself and other government and private organizations, as well as through interviews with representatives of professional and trade associations, unions, educators, and training experts, among other sources. For some occupations, such as physicians and lawyers, the education and

training preparation is straightforward, because it is established by government laws and regulations. For other occupations, such as computer programmers or industrial machinery repairers, jobs may vary considerably in their educational and training requirements. When an occupation has more than one path of entry, BLS identifies the one that research suggests is most preferred by employers.²

The 11 extant categories of education and training are as follows:

1. First professional degree
2. Doctoral degree
3. Master's degree
4. Bachelor's or higher degree, plus work experience
5. Bachelor's degree
6. Associate degree
7. Postsecondary vocational award
8. Work experience in a related occupation
9. Long-term on-the-job training
10. Moderate-term on-the-job training
11. Short-term on-the-job training

By construction, these categories are intended to be mutually exclusive and exhaustive. The order in which the categories are listed, from top to bottom, reflects a range from highest to lowest entry requirements. The principal purpose of this classification system is to provide career advice as to the most significant source of postsecondary training needed for entry into the various occupations.

In the past, however, the categories listed also have been used by numerous analysts (including BLS analysts) to calculate the percentage of projected net employment growth that will occur in occupations that “require” a bachelor's degree or higher or that require some college. The calculation involves subsuming the 11 categories under three educational classifications. Typically, analysts have assumed that categories 1–5 represent the “bachelor's degree or higher” classification and categories 6 and 7 the “some college” classification. Although categories 8–11 do not have an explicit educational attainment component and are reserved for occupations that offer on-the-job training or that generally require experience in a related occupation, analysts have inferred that these occupations combined represent a residual category of “high school or less.” Most often, this inference is made explicit by assuming that the total level of projected employment in the first two aggregate categories, “bachelor's degree or higher” and “some college,” is an estimate of the total number of pro-

¹ A sensitivity analysis of the results to the choice of the 25- to 44-year-old age group is presented on page 41.

² The material in this paragraph was adapted from descriptive material published by the BLS Projections Program.

jected jobs requiring at least some college education.

Using the education-and-training categories to describe the educational attainment of workers in occupations can be quite problematic, especially because they are not intended for that purpose. To see this, consider the occupations in categories 8–11. Jobs that generally require short-term on-the-job training (category 11) are ones for which less than 1 month of training suffices. Moderate-term training (category 10) is assumed to last more than 1 month and less than 12, and long-term training (category 9) lasts more than 1 year. Jobs that generally require work experience in a related occupation (category 8) are assumed to require a level of accumulated skills and experience higher than that of jobs in the long-term on-the-job-training category.

Although it seems reasonable to argue that a job in which a person can be trained in less than 1 month should be placed in the “high school or less” classification, the implicit or explicit use of that label to describe jobs in which the usual pathway is to undertake moderate or long-term training may be a misleading description of the educational hiring preferences of employers. In any number of occupations that put a new employee through a lengthy course of on-the-job training, one may not be surprised to find that employers typically try to hire individuals with at least some college education (or even a bachelor’s degree). In other occupations, a high school diploma may suffice. The point is that the link to the educational attainment preferences of employers is not automatic.

The addition of information on the distribution of educational attainment of each occupation highlights the fact that there are often multiple pathways into an occupation. For example, the most significant source of postsecondary education or training for electricians is long-term on-the-job training. However, assuming that an occupation is in the “high school or less” educational classification is inconsistent with actual data on educational attainment in the occupation: according to 2000–02 CPS data, although half of electricians aged 25 to 44 years are high school graduates, 44 percent have some college as their highest level of educational attainment. Owing to the fact that the most significant source of postsecondary education or training does not provide sufficient information on the educational background of employees, BLS will no longer use the classification system just described as the basis for constructing estimates of the total number of projected jobs generally requiring various levels of education or training. In the material that follows, an alternative paradigm is presented for estimating the number of projected jobs that will be filled by those with a high school education or less, those with some college, and those with a bachelor’s degree or higher. This paradigm groups occupations into broad education clusters on the basis of their educational attainment distributions and uses those clusters to construct the desired estimates.

The education clusters also are used to develop an approach to answering the question “What are the good jobs for those with and for those without a bachelor’s degree?”

Within each education cluster, occupations that pay a relatively high wage and that are projected to have high employment growth are identified, and the contribution of each occupation to the total projected employment change is measured.

Using the educational attainment distributions to identify occupational education clusters

Six education clusters are defined on the basis of the distribution of educational attainment across occupations. A *high school* occupation is defined as an occupation in which the percentage of employees aged 25 to 44 years and having high school as their highest level of educational attainment is greater than or equal to 60 percent—and the percentages of those with some college or with a bachelor’s degree or higher are each less than 20 percent.³ Occupations requiring *some college* and *college* occupations are similarly defined. Three “mixture” occupations are defined. An occupation requiring *high school/some college* is defined as an occupation in which the percentages of those with at most a high school diploma or some college as their highest level of educational attainment are each greater than 20 percent, while the percentage with a bachelor’s degree or higher is less than 20 percent. The other two mixture clusters, *some college/college* and *high school/some college/college* are similarly defined. The definitions of the six clusters are given in exhibit 1.

Exhibit 1. Definitions of education clusters

Education cluster	Percent of employees aged 25 to 44 in the occupation whose highest level of educational attainment is—		
	High school or less	Some college (including associate degree)	Bachelor’s degree or higher
High school occupations	Greater than or equal to 60 percent	Less than 20 percent	Less than 20 percent
High school/some college occupations	Greater than or equal to 20 percent	Greater than or equal to 20 percent	Less than 20 percent
Some college occupations	Less than 20 percent	Greater than or equal to 60 percent	Less than 20 percent
High school/some college/ college occupations	Greater than or equal to 20 percent	Greater than or equal to 20 percent	Greater than or equal to 20 percent
Some college/ college occupations	Less than 20 percent	Greater than or equal to 20 percent	Greater than or equal to 20 percent
College occupations	Less than 20 percent	Less than 20 percent	Greater than or equal to 60 percent

³ The age grouping of 25 to 44 years is used, although, in some cases, proxy estimates were obtained by estimating the educational distribution of those 25 years and older or 16 years and older.

Based on the logic of these definitions, one cluster that is missing from the list is the set of high school/college mixture occupations. These are occupations in which the percentage of employees with some college is less than 20 percent, while the percentage with high school or less and the percentage with a bachelor's degree or higher are both 20 percent or greater. Because only eight occupations fell into this category, those occupations were reassigned to the full mixture cluster, high school/some college/college.

The order of these clusters from top to bottom is designed to reflect the fact that earnings consistently increase with educational attainment. Hence, a *high school* occupation would be expected to have lower median earnings than it would as a *high school/some college* occupation. In a similar way, median earnings for a *high school/some college* occupation would be expected to be lower than they would be as a pure *some college* occupation. Moving from a *some college* occupation to the full mixture cluster, *high school/some college/college* represents the addition of lower high school earnings and higher college earnings, but the negative impact of high school earnings is expected to be less than the positive impact of college earnings, given the increasing relationship between earnings and educational attainment.

Table I-1 presents the educational attainment distributions of each of the 725 detailed occupations for which BLS published 2002–12 employment projections. The occupations are sorted first by the six education clusters just defined and then, within each cluster, in descending order based on the median earnings of the occupation from the 2002 OES survey. The 2002 and the 2012 projected employment levels of each occupation are shown, along with the numeric and percentage changes in employment over the projection period. For detailed information on methodology, see “The educational attainment distribution of occupations: A note on methodology” on page 33.

Comparing the most significant source of postsecondary education or training with the occupational education clusters

Table I-1 also shows the most significant source of postsecondary education or training that BLS assigns to each occupation.⁴ BLS occupational analysts assign these single classifications on the basis of extensive research that is conducted every 2 years in preparation for the publication of the agency's *Occupational Outlook Handbook*. Some occupations, such as physicians and lawyers, are more easily assigned single education and training levels than others, such as computer programmers or registered nurses. The latter two occupations are both assigned the associate degree as their most significant source of postsecondary education or training. The addition of information on educational attainment distribution underscores the idea that there are often multiple pathways to obtaining entry into an occupation and complements information identifying the most significant source of postsecondary education

or training.

In the case of registered nurses, for example, the development of programs that permit entry into the occupation through a combination of associate degree and long-term on-the-job training provides an important alternative route to either attending a three-year nursing school or obtaining a bachelor's degree in nursing. Still, as table I-1 indicates, 40.1 percent of registered nurses have some college as their highest level of educational attainment, while 58.1 percent have a bachelor's degree or higher. In fact, the percentage of registered nurses with a bachelor's degree or higher has grown over the last decade, rising from 49 percent in 1994. However, recent data from the National Center for Education Statistics on degrees awarded from 2001–02 show that the number of associate degrees awarded in nursing (41,783) continues to exceed the number of bachelor's degrees awarded (32,209). This gap may be the result of registered nurses initially entering the field with an associate degree and then returning later to complete a bachelor's degree. Alternatively, some may receive a bachelor's degree in another field and return to receive nursing training through an associate-degree program. On the basis of the balance of the evidence available, BLS continues to assign the associate degree as the most significant source of postsecondary education or training for the nursing occupation. The multiplicity of educational pathways into nursing, however, underscores the value of adding data on the educational attainment distribution of those in the occupation.

The grouping of occupations into the six education clusters provides a natural hierarchical sorting of occupations based on the training and skill requirements found within each cluster. It is not surprising that high school occupations all have short, moderate, or long-term on-the-job training as their most significant source of postsecondary education or training. Nor is it surprising that college occupations all have the bachelor's degree or higher as their most significant source of postsecondary education or training. By contrast, it is the mixture occupations that reflect a substantial diversity in the pathways to entry into occupations. In general, the occupations classified as “high school/some college” have a greater concentration of the short, moderate, and long-term training categories as their single education descriptor, while the “some college/college” occupations have a greater concentration of higher education awards as their single most significant source of postsecondary education or training.

The widest range of training and education categories is found in the full-mixture “high school/some college/college” occupations. An occupation such as flight attendant is classified as generally requiring long-term on-the-job training as its most significant source of postsecondary education or training, but the hiring pattern of employers results in a diverse mix of those with high school, some college, and bachelor's degree or higher backgrounds. This mix reflects the interplay between training requirements and employer preferences for characteristics

(Text continues on page 34)

⁴ See Chapter III for additional information about the categories.

Table I–1. Educational attainment cluster, most significant source of postsecondary education or training, and educational attainment distribution, by occupation¹

(Employment in thousands)

2002 national employment matrix occupation	Most significant source of postsecondary education or training ⁵	Educational attainment cluster ¹⁰	Percent of workers aged 25 to 44, by educational attainment		
			High school or less	Some college	College or higher
47-2021 Brickmasons and blockmasons	Long-term on-the-job training	HS	83.2	13.3	3.5
47-2072 Pile-driver operators ⁷	Moderate-term on-the-job training	HS	80.5	17.1	2.4
53-5021 Captains, mates, and pilots of water vessels	Work experience in a related occupation	HS	72.4	13.6	13.9
47-4041 Hazardous materials removal workers	Moderate-term on-the-job training	HS	74.3	18.0	7.7
47-2044 Tile and marble setters	Long-term on-the-job training	HS	77.6	18.4	3.9
47-2051 Cement masons and concrete finishers	Moderate-term on-the-job training	HS	85.4	12.7	2.0
47-2081 Drywall and ceiling tile installers	Moderate-term on-the-job training	HS	83.8	13.8	2.3
47-2082 Tapers	Moderate-term on-the-job training	HS	83.8	13.8	2.3
47-2181 Roofers	Moderate-term on-the-job training	HS	84.6	12.1	3.2
47-2041 Carpet installers	Moderate-term on-the-job training	HS	77.6	18.4	3.9
47-2171 Reinforcing iron and rebar workers ³	Long-term on-the-job training	HS	83.8	10.7	5.6
47-2053 Terrazzo workers and finishers ⁴	Long-term on-the-job training	HS	85.4	12.7	2.0
47-2022 Stonemasons	Long-term on-the-job training	HS	83.2	13.3	3.5
47-2161 Plasterers and stucco masons	Long-term on-the-job training	HS	86.7	10.6	2.7
47-2042 Floor layers, except carpet, wood, and hard tiles	Moderate-term on-the-job training	HS	77.6	18.4	3.9
53-7041 Hoist and winch operators ³	Moderate-term on-the-job training	HS	78.1	19.4	2.5
47-2071 Paving, surfacing, and tamping equipment operators ² ..	Moderate-term on-the-job training	HS	88.4	11.4	.2
51-7032 Patternmakers, wood ⁷	Long-term on-the-job training	HS	70.2	19.4	10.4
47-2141 Painters, construction and maintenance	Moderate-term on-the-job training	HS	77.2	16.9	5.9
45-1000 Supervisors, farming, fishing, and forestry workers	Work experience in a related occupation	HS	77.6	12.1	10.4
53-7021 Crane and tower operators	Moderate-term on-the-job training	HS	87.4	10.9	1.7
47-2073 Operating engineers and other construction equipment operators	Moderate-term on-the-job training	HS	78.5	19.1	2.4
53-7032 Excavating and loading machine and dragline operators	Moderate-term on-the-job training	HS	83.9	15.5	.7
45-3021 Hunters and trappers ⁷	Moderate-term on-the-job training	HS	74.0	18.0	8.0
47-2043 Floor sanders and finishers	Moderate-term on-the-job training	HS	77.6	18.4	3.9
47-5031 Explosives workers, ordnance handling experts, and blasters ⁷	Moderate-term on-the-job training	HS	76.6	19.5	3.8
51-4023 Rolling machine setters, operators, and tenders, metal and plastic ²	Moderate-term on-the-job training	HS	75.7	18.1	6.2
47-5012 Rotary drill operators, oil and gas ⁵	Moderate-term on-the-job training	HS	69.5	18.1	12.4
51-4035 Milling and planing machine setters, operators, and tenders, metal and plastic ⁷	Moderate-term on-the-job training	HS	78.4	19.0	2.6
47-5011 Derrick operators, oil and gas ⁵	Moderate-term on-the-job training	HS	69.5	18.1	12.4
53-7031 Dredge operators ⁴	Moderate-term on-the-job training	HS	83.9	15.5	.7
51-4191 Heat treating equipment setters, operators, and tenders, metal and plastic ²	Moderate-term on-the-job training	HS	78.6	18.5	2.9
47-5013 Service unit operators, oil, gas, and mining ⁵	Moderate-term on-the-job training	HS	69.5	18.1	12.4
47-5099 Extraction workers, all other ²	Moderate-term on-the-job training	HS	83.2	14.4	2.4
51-4051 Metal-refining furnace operators and tenders	Moderate-term on-the-job training	HS	77.9	18.2	3.9
51-4052 Pourers and casters, metal ²	Moderate-term on-the-job training	HS	78.5	15.5	6.0
53-7121 Tank car, truck, and ship loaders ⁷	Moderate-term on-the-job training	HS	77.0	19.5	3.5
45-4021 Fallers ⁴	Moderate-term on-the-job training	HS	85.1	10.8	4.1
51-6091 Extruding and forming machine setters, operators, and tenders, synthetic and glass fibers ⁷	Moderate-term on-the-job training	HS	80.3	14.5	5.2
53-7033 Loading machine operators, underground mining ⁴	Moderate-term on-the-job training	HS	83.9	15.5	.7
47-5061 Roof bolters, mining ⁷	Moderate-term on-the-job training	HS	76.6	19.5	3.8
53-7111 Shuttle car operators ⁷	Short-term on-the-job training	HS	77.0	19.5	3.5
47-4999 All other construction trades and related workers	Moderate-term on-the-job training	HS	81.0	11.4	7.6
49-9095 Manufactured building and mobile home installers	Moderate-term on-the-job training	HS	73.7	18.5	7.8
37-3011 Landscaping and groundskeeping workers	Short-term on-the-job training	HS	76.5	17.7	5.8
49-3092 Recreational vehicle service technicians ⁴	Long-term on-the-job training	HS	87.9	9.8	2.3
51-9111 Packaging and filling machine operators and tenders ..	Short-term on-the-job training	HS	81.7	15.5	2.8
49-9098 Helpers—installation, maintenance, and repair workers ²	Short-term on-the-job training	HS	83.6	15.5	.9
47-3019 All other helpers, construction trades ³	Short-term on-the-job training	HS	82.3	14.0	3.7
47-3016 Helpers—roofers ⁴	Short-term on-the-job training	HS	81.2	12.8	6.1
37-3013 Tree trimmers and pruners	Short-term on-the-job training	HS	76.5	17.7	5.8
51-3023 Slaughterers and meat packers	Moderate-term on-the-job training	HS	81.2	16.2	2.6
47-3013 Helpers—electricians	Short-term on-the-job training	HS	81.2	12.8	6.1

See footnotes at end of table.

Table I–1. Educational attainment cluster, most significant source of postsecondary education or training, and educational attainment distribution, by occupation¹

(Employment in thousands)

2002 median annual earnings		Employment		Employment change, 2002–12		2002 national employment matrix occupation
Dollars	Rank ¹¹	2002	2012	Numeric	Percent	
\$41,840	VH	148	169	21	14.2	47-2021 Brickmasons and blockmasons
45,420	VH	5	6	0	8.2	47-2072 Pile-driver operators ⁷
49,850	VH	25	26	1	2.4	53-5021 Captains, mates, and pilots of water vessels
32,460	H	38	54	16	43.1	47-4041 Hazardous materials removal workers
35,770	H	33	42	9	26.5	47-2044 Tile and marble setters
30,660	H	182	229	47	26.1	47-2051 Cement masons and concrete finishers
33,710	H	135	164	29	21.4	47-2081 Drywall and ceiling tile installers
39,000	H	41	49	8	20.8	47-2082 Tapers
30,180	H	166	197	31	18.6	47-2181 Roofers
32,590	H	82	96	14	16.8	47-2041 Carpet installers
36,740	H	29	33	5	16.7	47-2171 Reinforcing iron and rebar workers ³
27,910	H	6	7	1	15.2	47-2053 Terrazzo workers and finishers ⁴
34,040	H	17	19	2	14.1	47-2022 Stonemasons
33,100	H	59	67	8	13.5	47-2161 Plasterers and stucco masons
33,590	H	31	35	4	13.4	47-2042 Floor layers, except carpet, wood, and hard tiles
31,400	H	9	10	1	13.0	53-7041 Hoist and winch operators ³
28,860	H	58	65	7	12.6	47-2071 Paving, surfacing, and tamping equipment operators ²
29,780	H	4	5	0	11.8	51-7032 Patternmakers, wood ⁷
29,070	H	448	500	52	11.6	47-2141 Painters, construction and maintenance
31,140	H	52	58	6	11.4	45-1000 Supervisors, farming, fishing, and forestry workers
36,330	H	50	55	5	10.8	53-7021 Crane and tower operators
35,240	H	353	389	37	10.4	47-2073 Operating engineers and other construction equipment operators
32,410	H	80	87	7	8.9	53-7032 Excavating and loading machine and dragline operators
30,660	H	1	2	0	6.4	45-3021 Hunters and trappers ⁷
27,500	H	17	18	1	4.2	47-2043 Floor sanders and finishers
35,110	H	5	5	0	2.0	47-5031 Explosives workers, ordnance handling experts, and blasters ⁷
28,330	H	44	45	1	2.0	51-4023 Rolling machine setters, operators, and tenders, metal and plastic ²
33,750	H	14	14	0	1.5	47-5012 Rotary drill operators, oil and gas ⁵
29,210	H	31	31	0	.8	51-4035 Milling and planing machine setters, operators, and tenders, metal and plastic ⁷
29,820	H	15	15	0	.8	47-5011 Derrick operators, oil and gas ⁵
27,730	H	3	3	0	.3	53-7031 Dredge operators ⁴
28,200	H	29	29	0	-.6	51-4191 Heat treating equipment setters, operators, and tenders, metal and plastic ²
28,670	H	13	13	0	-.8	47-5013 Service unit operators, oil, gas, and mining ⁵
29,110	H	12	12	0	-.8	47-5099 Extraction workers, all other ²
30,770	H	18	17	0	-.8	51-4051 Metal-refining furnace operators and tenders
27,880	H	13	13	0	-2.0	51-4052 Pourers and casters, metal ²
32,500	H	17	17	0	-2.1	53-7121 Tank car, truck, and ship loaders ⁷
28,160	H	14	14	0	-3.4	45-4021 Fallers ⁴
27,500	H	27	24	-4	-13.1	51-6091 Extruding and forming machine setters, operators, and tenders, synthetic and glass fibers ⁷
31,930	H	4	3	-1	-14.1	53-7033 Loading machine operators, underground mining ⁴
38,430	H	4	3	-1	-27.7	47-5061 Roof bolters, mining ⁷
38,360	H	3	2	-1	-31.3	53-7111 Shuttle car operators ⁷
22,900	L	110	146	35	32.0	47-4999 All other construction trades and related workers
23,170	L	18	22	4	23.4	49-9095 Manufactured building and mobile home installers
19,770	L	1,074	1,311	237	22.0	37-3011 Landscaping and groundskeeping workers
27,080	L	13	15	3	21.8	49-3092 Recreational vehicle service technicians ⁴
21,210	L	387	468	82	21.2	51-9111 Packaging and filling machine operators and tenders
21,440	L	150	181	30	20.3	49-9098 Helpers—installation, maintenance, and repair workers ²
20,230	L	44	53	9	19.4	47-3019 All other helpers, construction trades ³
20,480	L	21	25	4	19.3	47-3016 Helpers—roofers ⁴
25,110	L	59	69	11	18.6	37-3013 Tree trimmers and pruners
20,370	L	128	151	23	18.2	51-3023 Slaughterers and meat packers
23,090	L	99	117	18	18.0	47-3013 Helpers—electricians

See footnotes at end of table.

Table I-1. Educational attainment cluster, most significant source of postsecondary education or training, and educational attainment distribution, by occupation¹—Continued

(Employment in thousands)

2002 national employment matrix occupation	Most significant source of postsecondary education or training ⁶	Educational attainment cluster ¹⁰	Percent of workers aged 25 to 44, by educational attainment		
			High school or less	Some college	College or higher
53-7081 Refuse and recyclable material collectors	Short-term on-the-job training	HS	79.0	14.6	6.4
47-4091 Segmental pavers ⁴	Moderate-term on-the-job training	HS	81.0	11.4	7.6
37-9099 All other building and grounds cleaning and maintenance workers	Short-term on-the-job training	HS	79.2	17.3	3.5
47-3014 Helpers—painters, paperhangers, plasterers, and stucco masons ⁴	Short-term on-the-job training	HS	81.2	12.8	6.1
47-5051 Rock splitters, quarry ⁴	Moderate-term on-the-job training	HS	84.0	12.8	3.3
47-2061 Construction laborers	Moderate-term on-the-job training	HS	79.5	15.6	4.8
47-3012 Helpers—carpenters	Short-term on-the-job training	HS	81.2	12.8	6.1
47-4031 Fence erectors	Moderate-term on-the-job training	HS	75.5	17.5	7.0
53-7011 Conveyor operators and tenders ⁷	Short-term on-the-job training	HS	77.0	19.5	3.5
53-7051 Industrial truck and tractor operators	Short-term on-the-job training	HS	78.8	17.9	3.3
47-3015 Helpers—pipelayers, plumbers, pipefitters, and steamfitters ²	Short-term on-the-job training	HS	80.8	13.8	5.4
49-3022 Automotive glass installers and repairers	Long-term on-the-job training	HS	77.6	12.7	9.7
51-7031 Model makers, wood ⁷	Long-term on-the-job training	HS	70.2	19.4	10.4
37-3012 Pesticide handlers, sprayers, and applicators, vegetation	Moderate-term on-the-job training	HS	76.5	17.7	5.8
51-3093 Food cooking machine operators and tenders ³	Short-term on-the-job training	HS	81.7	14.0	4.4
49-3093 Tire repairers and changers	Short-term on-the-job training	HS	87.9	9.8	2.3
51-9031 Cutters and trimmers, hand	Short-term on-the-job training	HS	81.1	17.0	1.9
51-3092 Food batchmakers	Short-term on-the-job training	HS	77.1	18.4	4.5
51-9193 Cooling and freezing equipment operators and tenders ⁷	Moderate-term on-the-job training	HS	75.3	19.9	4.8
51-9192 Cleaning, washing, and metal pickling equipment operators and tenders ²	Moderate-term on-the-job training	HS	88.0	8.9	3.1
51-9032 Cutting and slicing machine setters, operators, and tenders	Moderate-term on-the-job training	HS	81.1	17.0	1.9
47-5071 Roustabouts, oil and gas ⁷	Moderate-term on-the-job training	HS	76.6	19.5	3.8
51-9195 Molders, shapers, and casters, except metal and plastic	Moderate-term on-the-job training	HS	64.6	17.3	18.1
45-2021 Animal breeders ⁷	Moderate-term on-the-job training	HS	81.8	12.9	5.3
45-9099 All other farming, fishing, and forestry workers	Moderate-term on-the-job training	HS	83.6	11.8	4.6
51-3091 Food and tobacco roasting, baking, and drying machine operators and tenders ⁷	Short-term on-the-job training	HS	76.9	18.9	4.2
47-5081 Helpers—extraction workers ⁷	Short-term on-the-job training	HS	76.6	19.5	3.8
51-7021 Furniture finishers	Long-term on-the-job training	HS	76.3	17.2	6.5
53-5022 Motorboat operators ⁴	Moderate-term on-the-job training	HS	72.4	13.6	13.9
51-4033 Grinding, lapping, polishing, and buffing machine tool setters, operators, and tenders, metal and plastic	Moderate-term on-the-job training	HS	82.5	13.8	3.6
47-3011 Helpers—brickmasons, blockmasons, stonemasons, and tile and marble setters ³	Short-term on-the-job training	HS	82.3	14.0	3.7
51-9191 Cementing and gluing machine operators and tenders	Moderate-term on-the-job training	HS	82.7	17.3	.0
51-7041 Sawing machine setters, operators, and tenders, wood	Moderate-term on-the-job training	HS	86.1	13.5	.4
45-4023 Log graders and scalers ⁴	Moderate-term on-the-job training	HS	85.1	10.8	4.1
53-7063 Machine feeders and offbearers	Short-term on-the-job training	HS	81.0	15.7	3.3
51-3021 Butchers and meat cutters	Long-term on-the-job training	HS	81.2	16.2	2.6
51-4193 Plating and coating machine setters, operators, and tenders, metal and plastic	Moderate-term on-the-job training	HS	86.4	7.4	6.3
45-4022 Logging equipment operators ²	Moderate-term on-the-job training	HS	83.3	12.5	4.2
51-6093 Upholsterers	Long-term on-the-job training	HS	80.1	19.9	.0
51-6062 Textile cutting machine setters, operators, and tenders ²	Moderate-term on-the-job training	HS	90.7	8.5	.8
51-6092 Fabric and apparel patternmakers ⁷	Long-term on-the-job training	HS	80.3	14.5	5.2
51-6042 Shoe machine operators and tenders ⁴	Moderate-term on-the-job training	HS	83.7	10.4	6.0
45-3011 Fishers and related fishing workers	Moderate-term on-the-job training	HS	75.4	16.2	8.4
51-6061 Textile bleaching and dyeing machine operators and tenders ⁷	Moderate-term on-the-job training	HS	88.5	9.8	1.7

See footnotes at end of table.

Table I-1. Educational attainment cluster, most significant source of postsecondary education or training, and educational attainment distribution, by occupation¹—Continued

(Employment in thousands)

2002 median annual earnings		Employment		Employment change, 2002–12		2002 national employment matrix occupation
Dollars	Rank ¹¹	2002	2012	Numeric	Percent	
\$24,130	L	134	158	24	17.6	53-7081 Refuse and recyclable material collectors
26,940	L	2	3	0	16.5	47-4091 Segmental pavers ⁴
20,990	L	125	145	20	16.1	37-9099 All other building and grounds cleaning and maintenance workers
20,100	L	31	36	5	15.9	47-3014 Helpers—painters, paperhangers, plasterers, and stucco masons ⁴
26,170	L	3	3	0	14.3	47-5051 Rock splitters, quarry ⁴
24,740	L	938	1,070	133	14.2	47-2061 Construction laborers
21,510	L	97	111	14	14.0	47-3012 Helpers—carpenters
22,160	L	27	31	4	13.4	47-4031 Fence erectors
24,250	L	58	65	7	12.4	53-7011 Conveyor operators and tenders ⁷
26,070	L	594	659	66	11.1	53-7051 Industrial truck and tractor operators
22,230	L	79	88	9	10.9	47-3015 Helpers—pipelayers, plumbers, pipefitters, and steamfitters ²
26,890	L	22	24	2	10.7	49-3022 Automotive glass installers and repairers
24,740	L	4	5	0	10.3	51-7031 Model makers, wood ⁷
24,830	L	27	30	3	9.7	37-3012 Pesticide handlers, sprayers, and applicators, vegetation
21,860	L	34	37	3	8.8	51-3093 Food cooking machine operators and tenders ³
20,160	L	83	89	7	8.0	49-3093 Tire repairers and changers
22,020	L	31	33	2	7.6	51-9031 Cutters and trimmers, hand
21,920	L	74	79	5	7.2	51-3092 Food batchmakers
21,240	L	7	8	1	7.1	51-9193 Cooling and freezing equipment operators and tenders ⁷
22,850	L	18	19	1	6.9	51-9192 Cleaning, washing, and metal pickling equipment operators and tenders ²
25,690	L	77	83	5	6.6	51-9032 Cutting and slicing machine setters, operators, and tenders
22,280	L	32	34	2	6.4	47-5071 Roustabouts, oil and gas ⁷
24,700	L	46	49	3	6.4	51-9195 Molders, shapers, and casters, except metal and plastic
25,090	L	9	10	1	6.1	45-2021 Animal breeders ⁷
21,450	L	96	101	4	4.5	45-9099 All other farming, fishing, and forestry workers
23,260	L	19	20	1	4.2	51-3091 Food and tobacco roasting, baking, and drying machine operators and tenders ⁷
25,200	L	29	30	1	3.9	47-5081 Helpers—extraction workers ⁷
22,710	L	39	41	1	3.3	51-7021 Furniture finishers
26,440	L	4	4	0	2.7	53-5022 Motorboat operators ⁴
26,120	L	104	106	3	2.4	51-4033 Grinding, lapping, polishing, and buffing machine tool setters, operators, and tenders, metal and plastic
24,390	L	59	61	1	2.2	47-3011 Helpers—brickmasons, blockmasons, stonemasons, and tile and marble setters ³
23,190	L	27	28	0	1.0	51-9191 Cementing and gluing machine operators and tenders
22,080	L	56	56	0	-.2	51-7041 Sawing machine setters, operators, and tenders, wood
27,200	L	10	10	0	-1.2	45-4023 Log graders and scalers ⁴
21,840	L	164	162	-2	-1.4	53-7063 Machine feeders and offbearers
25,500	L	132	129	-3	-2.5	51-3021 Butchers and meat cutters
25,420	L	44	42	-1	-2.6	51-4193 Plating and coating machine setters, operators, and tenders, metal and plastic
26,790	L	43	41	-2	-3.6	45-4022 Logging equipment operators ²
24,670	L	56	51	-5	-8.7	51-6093 Upholsterers
20,320	L	34	26	-8	-22.6	51-6062 Textile cutting machine setters, operators, and tenders ²
26,360	L	11	8	-3	-24.6	51-6092 Fabric and apparel patternmakers ⁷
20,600	L	7	5	-2	-26.1	51-6042 Shoe machine operators and tenders ⁴
20,710	L	36	27	-10	-26.8	45-3011 Fishers and related fishing workers
20,800	L	27	19	-8	-28.7	51-6061 Textile bleaching and dyeing machine operators and tenders ⁷

See footnotes at end of table.

Table I-1. Educational attainment cluster, most significant source of postsecondary education or training, and educational attainment distribution, by occupation¹—Continued

(Employment in thousands)

2002 national employment matrix occupation	Most significant source of postsecondary education or training ⁵	Educational attainment cluster ¹⁰	Percent of workers aged 25 to 44, by educational attainment		
			High school or less	Some college	College or higher
51-6064 Textile winding, twisting, and drawing out machine setters, operators, and tenders	Moderate-term on-the-job training	HS	87.9	11.7	.4
51-6063 Textile knitting and weaving machine setters, operators, and tenders	Long-term on-the-job training	HS	89.3	7.9	2.8
53-3099 All other motor vehicle operators ²	Short-term on-the-job training	HS	73.0	16.8	10.2
35-3021 Combined food preparation and serving workers, including fast food	Short-term on-the-job training	HS	76.7	18.1	5.3
35-2021 Food preparation workers	Short-term on-the-job training	HS	76.9	17.7	5.4
53-6021 Parking lot attendants	Short-term on-the-job training	HS	70.3	19.4	10.3
49-3091 Bicycle repairers ⁴	Moderate-term on-the-job training	HS	87.9	9.8	2.3
37-2011 Janitors and cleaners, except maids and housekeeping cleaners	Short-term on-the-job training	HS	79.2	17.3	3.5
51-3022 Meat, poultry, and fish cutters and trimmers	Short-term on-the-job training	HS	81.2	16.2	2.6
35-2014 Cooks, restaurant	Long-term on-the-job training	HS	78.3	16.4	5.3
35-9098 All other food preparation and serving related workers	Short-term on-the-job training	HS	78.3	16.4	5.3
35-9011 Dining room and cafeteria attendants and bartender helpers	Short-term on-the-job training	HS	78.4	14.6	7.0
53-7064 Packers and packagers, hand	Short-term on-the-job training	HS	83.3	12.6	4.1
51-3099 All other food processing workers	Short-term on-the-job training	HS	81.2	16.2	2.6
51-6011 Laundry and dry-cleaning workers	Moderate-term on-the-job training	HS	82.4	13.6	4.0
37-2012 Maid and housekeeping cleaners	Short-term on-the-job training	HS	81.5	13.9	4.6
35-9021 Dishwashers	Short-term on-the-job training	HS	89.6	7.4	3.0
35-2015 Cooks, short order	Short-term on-the-job training	HS	78.3	16.4	5.3
53-7061 Cleaners of vehicles and equipment	Short-term on-the-job training	HS	78.1	17.4	4.5
51-9198 Helpers—production workers	Short-term on-the-job training	HS	77.3	17.3	5.4
45-2091 Agricultural equipment operators	Moderate-term on-the-job training	HS	83.6	11.8	4.6
45-2041 Graders and sorters, agricultural products	Work experience in a related occupation	HS	80.9	12.0	7.1
35-2011 Cooks, fast food	Short-term on-the-job training	HS	78.3	16.4	5.3
45-4011 Forest and conservation workers ²	Moderate-term on-the-job training	HS	73.2	16.3	10.6
45-2093 Farmworkers, farm and ranch animals	Short-term on-the-job training	HS	83.6	11.8	4.6
45-2092 Farmworkers and laborers, crop, nursery, and greenhouse	Short-term on-the-job training	HS	83.6	11.8	4.6
51-6099 All other textile, apparel, and furnishings workers	Short-term on-the-job training	HS	86.2	10.5	3.4
35-2012 Cooks, institution and cafeteria	Moderate-term on-the-job training	HS	78.3	16.4	5.3
51-6021 Pressers, textile, garment, and related materials	Short-term on-the-job training	HS	89.8	8.4	1.8
35-2013 Cooks, private household ⁴	Long-term on-the-job training	HS	78.3	16.4	5.3
51-6031 Sewing machine operators	Moderate-term on-the-job training	HS	86.7	10.2	3.1
47-4021 Elevator installers and repairers	Long-term on-the-job training	HS/SC	68.4	31.3	.3
49-1011 First-line supervisors/managers of mechanics, installers, and repairers	Work experience in a related occupation	HS/SC	47.7	40.2	12.1
47-1011 First-line supervisors/managers of construction trades and extraction workers	Work experience in a related occupation	HS/SC	63.0	26.9	10.1
53-4039 Subway, streetcar operators and all other rail transportation workers ⁷	Work experience in a related occupation	HS/SC	50.9	37.6	11.6
11-9071 Gaming managers ²	Work experience in a related occupation	HS/SC	38.0	45.8	16.2
53-1031 First-line supervisors/managers of transportation and material-moving machine and vehicle operators	Work experience in a related occupation	HS/SC	50.0	36.5	13.5
49-9012 Control and valve installers and repairers, except mechanical door ²	Moderate-term on-the-job training	HS/SC	55.9	34.2	9.9
33-2020 Fire inspectors ²	Work experience in a related occupation	HS/SC	44.7	38.9	16.4
49-3011 Aircraft mechanics and service technicians	Postsecondary vocational award	HS/SC	36.1	52.7	11.2
17-3023 Electrical and electronic engineering technicians	Associate degree	HS/SC	28.8	54.5	16.7
51-1011 First-line supervisors/managers of production and operating workers	Work experience in a related occupation	HS/SC	58.7	28.8	12.5
17-3026 Industrial engineering technicians	Associate degree	HS/SC	28.8	54.5	16.7
53-6051 Transportation inspectors	Work experience in a related occupation	HS/SC	39.7	45.9	14.4
49-9069 All other precision instrument and equipment repairers ²	Long-term on-the-job training	HS/SC	38.6	43.4	18.0
51-8092 Gas plant operators ⁴	Long-term on-the-job training	HS/SC	54.6	39.0	6.4

See footnotes at end of table.

Table I-1. Educational attainment cluster, most significant source of postsecondary education or training, and educational attainment distribution, by occupation¹—Continued

(Employment in thousands)

2002 median annual earnings		Employment		Employment change, 2002–12		2002 national employment matrix occupation
Dollars	Rank ¹¹	2002	2012	Numeric	Percent	
\$21,920	L	66	46	-20	-30.3	51-6064 Textile winding, twisting, and drawing out machine setters, operators, and tenders
22,970	L	53	33	-20	-38.6	51-6063 Textile knitting and weaving machine setters, operators, and tenders
18,820	VL	111	139	28	25.2	53-3099 All other motor vehicle operators ²
14,500	VL	1,990	2,444	454	22.8	35-3021 Combined food preparation and serving workers, including fast food
16,330	VL	850	1,022	172	20.2	35-2021 Food preparation workers
16,320	VL	107	128	21	19.2	53-6021 Parking lot attendants
19,230	VL	7	8	1	18.8	49-3091 Bicycle repairers ⁴
18,250	VL	2,267	2,681	414	18.3	37-2011 Janitors and cleaners, except maids and housekeeping cleaners
17,820	VL	154	179	25	16.4	51-3022 Meat, poultry, and fish cutters and trimmers
19,050	VL	727	843	116	15.9	35-2014 Cooks, restaurant
16,320	VL	117	134	18	15.2	35-9098 All other food preparation and serving related workers
14,530	VL	409	470	61	14.9	35-9011 Dining room and cafeteria attendants and bartender helpers
16,700	VL	920	1,052	132	14.4	53-7064 Packers and packagers, hand
19,410	VL	42	48	6	13.4	51-3099 All other food processing workers
16,780	VL	231	260	29	12.3	51-6011 Laundry and dry-cleaning workers
16,440	VL	1,492	1,629	137	9.2	37-2012 Maid and housekeeping cleaners
14,860	VL	505	551	46	9.0	35-9021 Dishwashers
16,270	VL	227	247	20	9.0	35-2015 Cooks, short order
17,060	VL	344	374	30	8.7	53-7061 Cleaners of vehicles and equipment
19,240	VL	467	503	36	7.7	51-9198 Helpers—production workers
17,290	VL	61	65	4	7.3	45-2091 Agricultural equipment operators
15,940	VL	49	52	3	6.7	45-2041 Graders and sorters, agricultural products
14,350	VL	588	617	29	5.0	35-2011 Cooks, fast food
18,960	VL	14	15	1	4.5	45-4011 Forest and conservation workers ²
17,090	VL	53	56	2	4.4	45-2093 Farmworkers, farm and ranch animals
15,070	VL	617	641	24	4.0	45-2092 Farmworkers and laborers, crop, nursery, and greenhouse
18,740	VL	61	63	2	3.3	51-6099 All other textile, apparel, and furnishings workers
18,140	VL	436	445	9	2.1	35-2012 Cooks, institution and cafeteria
17,070	VL	91	91	0	-2	51-6021 Pressers, textile, garment, and related materials
16,692	VL	8	8	0	-5.4	35-2013 Cooks, private household ⁴
17,440	VL	315	216	-99	-31.5	51-6031 Sewing machine operators
54,070	VH	21	25	4	17.1	47-4021 Elevator installers and repairers
47,580	VH	444	512	68	15.4	49-1011 First-line supervisors/managers of mechanics, installers, and repairers
47,670	VH	633	722	89	14.1	47-1011 First-line supervisors/managers of construction trades and extraction workers
44,680	VH	15	17	2	13.2	53-4039 Subway, streetcar operators and all other rail transportation workers ⁷
54,330	VH	6	7	1	12.4	11-9071 Gaming managers ²
42,910	VH	207	232	25	12.0	53-1031 First-line supervisors/managers of transportation and material-moving machine and vehicle operators
43,460	VH	38	42	5	12.0	49-9012 Control and valve installers and repairers, except mechanical door ²
44,250	VH	14	16	2	11.6	33-2020 Fire inspectors ²
43,070	VH	131	145	14	11.0	49-3011 Aircraft mechanics and service technicians
42,950	VH	204	224	20	10.0	17-3023 Electrical and electronic engineering technicians
42,930	VH	733	803	70	9.5	51-1011 First-line supervisors/managers of production and operating workers
41,910	VH	62	67	5	8.7	17-3026 Industrial engineering technicians
48,450	VH	29	32	2	7.7	53-6051 Transportation inspectors
44,090	VH	17	18	1	7.0	49-9069 All other precision instrument and equipment repairers ²
48,340	VH	12	13	1	6.7	51-8092 Gas plant operators ⁴

See footnotes at end of table.

Table I-1. Educational attainment cluster, most significant source of postsecondary education or training, and educational attainment distribution, by occupation¹—Continued

(Employment in thousands)

2002 national employment matrix occupation	Most significant source of postsecondary education or training ⁵	Educational attainment cluster ¹⁰	Percent of workers aged 25 to 44, by educational attainment		
			High school or less	Some college	College or higher
49-9044 Millwrights	Long-term on-the-job training	HS/SC	60.2	39.3	.5
53-5031 Ship engineers ⁷	Postsecondary vocational award	HS/SC	59.5	26.6	13.9
49-2091 Avionics technicians ⁷	Postsecondary vocational award	HS/SC	49.4	44.1	6.5
47-2011 Boilermakers ²	Long-term on-the-job training	HS/SC	66.0	31.2	2.8
49-9051 Electrical power-line installers and repairers	Long-term on-the-job training	HS/SC	61.1	34.6	4.3
17-3021 Aerospace engineering and operations technicians ²	Associate degree	HS/SC	29.9	53.8	16.2
53-7071 Gas compressor and gas pumping station operators ⁵ ..	Moderate-term on-the-job training	HS/SC	52.2	38.8	9.0
51-4111 Tool and die makers	Long-term on-the-job training	HS/SC	47.5	47.3	5.2
51-8013 Power plant operators	Long-term on-the-job training	HS/SC	49.8	38.0	12.2
51-8021 Stationary engineers and boiler operators	Long-term on-the-job training	HS/SC	53.7	35.4	11.0
49-2095 Electrical and electronics repairers, powerhouse, substation, and relay ⁵	Postsecondary vocational award	HS/SC	31.5	63.4	5.1
49-2022 Telecommunications equipment installers and repairers, except line installers	Long-term on-the-job training	HS/SC	40.8	48.2	11.0
51-8012 Power distributors and dispatchers ³	Long-term on-the-job training	HS/SC	47.1	40.5	12.4
49-9097 Signal and track switch repairers ⁷	Moderate-term on-the-job training	HS/SC	63.2	28.2	8.6
51-8011 Nuclear power reactor operators ⁴	Long-term on-the-job training	HS/SC	49.8	38.0	12.2
53-4031 Railroad conductors and yardmasters	Work experience in a related occupation	HS/SC	46.8	42.4	10.9
53-4010 Locomotive engineers and firers	Work experience in a related occupation	HS/SC	46.8	47.3	5.9
51-8093 Petroleum pump system operators, refinery operators, and gaugers ²	Long-term on-the-job training	HS/SC	57.6	37.5	4.9
51-8091 Chemical plant and system operators	Long-term on-the-job training	HS/SC	54.6	39.0	6.4
53-4021 Railroad brake, signal, and switch operators ⁷	Work experience in a related occupation	HS/SC	50.9	37.6	11.6
29-2054 Respiratory therapy technicians	Postsecondary vocational award	HS/SC	33.7	54.0	12.3
49-9021 Heating, air conditioning, and refrigeration mechanics and installers	Long-term on-the-job training	HS/SC	59.6	36.8	3.6
49-2098 Security and fire alarm systems installers	Postsecondary vocational award	HS/SC	49.0	44.8	6.2
43-9031 Desktop publishers ⁷	Postsecondary vocational award	HS/SC	42.6	41.1	16.3
17-3025 Environmental engineering technicians ²	Associate degree	HS/SC	29.9	53.8	16.2
29-2055 Surgical technologists	Postsecondary vocational award	HS/SC	33.7	54.0	12.3
33-3012 Correctional officers and jailers	Moderate-term on-the-job training	HS/SC	43.1	46.9	10.0
47-2111 Electricians	Long-term on-the-job training	HS/SC	49.8	44.1	6.1
17-3031 Surveying and mapping technicians	Moderate-term on-the-job training	HS/SC	47.5	45.4	7.2
49-9011 Mechanical door repairers ⁴	Moderate-term on-the-job training	HS/SC	59.2	30.0	10.8
37-1012 First-line supervisors/managers of landscaping, lawn service, and groundskeeping workers	Work experience in a related occupation	HS/SC	50.7	29.5	19.8
47-4071 Septic tank servicers and sewer pipe cleaners ³	Moderate-term on-the-job training	HS/SC	66.2	28.5	5.3
49-9094 Locksmiths and safe repairers	Moderate-term on-the-job training	HS/SC	70.7	25.2	4.1
33-2011 Fire fighters	Long-term on-the-job training	HS/SC	25.9	57.8	16.3
29-2061 Licensed practical and licensed vocational nurses	Postsecondary vocational award	HS/SC	23.2	71.7	5.1
47-2211 Sheet metal workers	Moderate-term on-the-job training	HS/SC	68.7	29.5	1.8
49-2099 All other electrical and electronic equipment mechanics, installers, and repairers	Postsecondary vocational award	HS/SC	40.8	48.2	11.0
53-3032 Truck drivers, heavy and tractor-trailer	Moderate-term on-the-job training	HS/SC	70.9	24.2	4.9
43-6012 Legal secretaries	Postsecondary vocational award	HS/SC	37.2	47.0	15.9
49-9052 Telecommunications line installers and repairers	Long-term on-the-job training	HS/SC	48.1	46.5	5.3
47-2152 Plumbers, pipefitters, and steamfitters	Long-term on-the-job training	HS/SC	67.0	28.8	4.2
49-3051 Motorboat mechanics ²	Long-term on-the-job training	HS/SC	62.9	34.7	2.4
51-9122 Painters, transportation equipment	Moderate-term on-the-job training	HS/SC	76.7	20.8	2.5
47-2121 Glaziers	Long-term on-the-job training	HS/SC	61.3	33.9	4.8
51-4121 Welders, cutters, solderers, and brazers	Long-term on-the-job training	HS/SC	74.6	23.2	2.2
49-9042 Maintenance and repair workers, general	Moderate-term on-the-job training	HS/SC	56.7	34.8	8.5
37-1011 First-line supervisors/managers of housekeeping and janitorial workers	Work experience in a related occupation	HS/SC	61.7	29.6	8.6
51-9082 Medical appliance technicians ²	Long-term on-the-job training	HS/SC	50.4	34.2	15.4
51-8031 Water and liquid waste treatment plant and system operators	Long-term on-the-job training	HS/SC	48.7	43.8	7.5
47-2221 Structural iron and steel workers	Long-term on-the-job training	HS/SC	70.9	27.8	1.3
27-2032 Choreographers ³	Work experience in a related occupation	HS/SC	57.5	33.5	9.0
35-1011 Chefs and head cooks	Work experience in a related occupation	HS/SC	47.7	38.0	14.3
47-2130 Insulation workers	Moderate-term on-the-job training	HS/SC	66.1	30.6	3.4

See footnotes at end of table.

Table I-1. Educational attainment cluster, most significant source of postsecondary education or training, and educational attainment distribution, by occupation¹—Continued

(Employment in thousands)

2002 median annual earnings		Employment		Employment change, 2002–12		2002 national employment matrix occupation
Dollars	Rank ¹¹	2002	2012	Numeric	Percent	
\$41,990	VH	69	73	4	5.3	49-9044 Millwrights
51,190	VH	8	9	0	4.5	53-5031 Ship engineers ⁷
42,030	VH	23	24	1	3.4	49-2091 Avionics technicians ⁷
41,960	VH	25	25	0	1.7	47-2011 Boilermakers ²
48,530	VH	101	103	2	1.6	49-9051 Electrical power-line installers and repairers
51,650	VH	15	15	0	1.5	17-3021 Aerospace engineering and operations technicians ²
42,510	VH	7	7	0	1.0	53-7071 Gas compressor and gas pumping station operators ⁵
42,730	VH	109	110	0	.4	51-4111 Tool and die makers
49,920	VH	35	36	0	.3	51-8013 Power plant operators
43,240	VH	55	56	0	.3	51-8021 Stationary engineers and boiler operators
51,690	VH	21	21	0	-.6	49-2095 Electrical and electronics repairers, powerhouse, substation, and relay ⁵
47,380	VH	219	217	-1	-.6	49-2022 Telecommunications equipment installers and repairers, except line installers
54,120	VH	12	12	0	-3.0	51-8012 Power distributors and dispatchers ³
43,370	VH	8	8	0	-3.0	49-9097 Signal and track switch repairers ⁷
61,060	VH	3	3	0	-3.2	51-8011 Nuclear power reactor operators ⁴
44,490	VH	38	36	-2	-4.2	53-4031 Railroad conductors and yardmasters
45,450	VH	33	31	-2	-7.2	53-4010 Locomotive engineers and firers
49,280	VH	39	35	-4	-11.0	51-8093 Petroleum pump system operators, refinery operators, and gaugers ²
43,940	VH	58	51	-7	-12.3	51-8091 Chemical plant and system operators
43,520	VH	15	12	-3	-22.8	53-4021 Railroad brake, signal, and switch operators ⁷
34,130	H	26	35	9	34.2	29-2054 Respiratory therapy technicians
34,900	H	249	328	79	31.8	49-9021 Heating, air conditioning, and refrigeration mechanics and installers
32,370	H	46	60	14	30.2	49-2098 Security and fire alarm systems installers
31,620	H	35	45	10	29.2	43-9031 Desktop publishers ⁷
36,850	H	19	24	5	28.4	17-3025 Environmental engineering technicians ²
31,210	H	72	92	20	27.9	29-2055 Surgical technologists
32,670	H	427	531	103	24.2	33-3012 Correctional officers and jailers
41,390	H	659	814	154	23.4	47-2111 Electricians
29,230	H	60	74	14	23.2	17-3031 Surveying and mapping technicians
29,190	H	11	13	2	21.8	49-9011 Mechanical door repairers ⁴
33,050	H	150	182	32	21.6	37-1012 First-line supervisors/managers of landscaping, lawn service, and groundskeeping workers
27,940	H	18	22	4	21.2	47-4071 Septic tank servicers and sewer pipe cleaners ³
28,430	H	23	28	5	21.0	49-9094 Locksmiths and safe repairers
36,230	H	282	340	58	20.7	33-2011 Fire fighters
31,440	H	702	844	142	20.2	29-2061 Licensed practical and licensed vocational nurses
34,560	H	205	246	41	19.8	47-2211 Sheet metal workers
35,160	H	22	26	4	19.6	49-2099 All other electrical and electronic equipment mechanics, installers, and repairers
33,210	H	1,767	2,104	337	19.0	53-3032 Truck drivers, heavy and tractor-trailer
35,020	H	264	313	50	18.8	43-6012 Legal secretaries
39,640	H	167	199	31	18.8	49-9052 Telecommunications line installers and repairers
40,170	H	492	584	92	18.7	47-2152 Plumbers, pipefitters, and steamfitters
29,050	H	22	26	4	18.3	49-3051 Motorboat mechanics ²
33,550	H	50	59	9	17.5	51-9122 Painters, transportation equipment
31,620	H	49	57	8	17.2	47-2121 Glaziers
29,160	H	391	457	66	17.0	51-4121 Welders, cutters, solderers, and brazers
29,370	H	1,266	1,472	207	16.3	49-9042 Maintenance and repair workers, general
28,140	H	230	267	37	16.2	37-1011 First-line supervisors/managers of housekeeping and janitorial workers
27,680	H	14	16	2	16.1	51-9082 Medical appliance technicians ²
33,390	H	99	115	16	16.0	51-8031 Water and liquid waste treatment plant and system operators
40,660	H	78	90	12	15.9	47-2221 Structural iron and steel workers
29,470	H	17	20	3	15.8	27-2032 Choreographers ³
27,940	H	132	153	21	15.8	35-1011 Chefs and head cooks
28,930	H	53	62	8	15.8	47-2130 Insulation workers

See footnotes at end of table.

Table I-1. Educational attainment cluster, most significant source of postsecondary education or training, and educational attainment distribution, by occupation¹—Continued

(Employment in thousands)

2002 national employment matrix occupation		Most significant source of postsecondary education or training ⁵	Educational attainment cluster ¹⁰	Percent of workers aged 25 to 44, by educational attainment		
				High school or less	Some college	College or higher
53-1011	Aircraft cargo handling supervisors ⁴	Work experience in a related occupation	HS/SC	50.0	36.5	13.5
51-4192	Lay-out workers, metal and plastic ⁷	Moderate-term on-the-job training	HS/SC	76.3	20.0	3.7
43-5011	Cargo and freight agents	Moderate-term on-the-job training	HS/SC	50.1	36.7	13.2
49-3099	All other vehicle and mobile equipment mechanics, installers, and repairers	Moderate-term on-the-job training	HS/SC	66.8	30.0	3.2
53-3021	Bus drivers, transit and intercity	Moderate-term on-the-job training	HS/SC	63.9	29.2	7.0
49-9062	Medical equipment repairers	Associate degree	HS/SC	36.0	49.0	15.0
51-4061	Model makers, metal and plastic ⁵	Moderate-term on-the-job training	HS/SC	59.0	38.5	2.4
43-5032	Dispatchers, except police, fire, and ambulance	Moderate-term on-the-job training	HS/SC	44.1	43.7	12.2
49-9096	Riggers ⁷	Short-term on-the-job training	HS/SC	63.2	28.2	8.6
49-3031	Bus and truck mechanics and diesel engine specialists	Postsecondary vocational award	HS/SC	66.0	30.6	3.4
53-1021	First-line supervisors/managers of helpers, laborers, and material movers, hand	Work experience in a related occupation	HS/SC	50.0	36.5	13.5
49-3021	Automotive body and related repairers	Long-term on-the-job training	HS/SC	73.7	21.8	4.5
51-4012	Numerical tool and process control programmers ⁴	Long-term on-the-job training	HS/SC	58.5	36.5	5.0
43-5031	Police, fire, and ambulance dispatchers	Moderate-term on-the-job training	HS/SC	44.1	43.7	12.2
49-3023	Automotive service technicians and mechanics	Postsecondary vocational award	HS/SC	66.8	30.0	3.2
49-9099	Installation, maintenance, and repair workers, all other	Moderate-term on-the-job training	HS/SC	62.3	25.6	12.1
47-2151	Pipelayers	Moderate-term on-the-job training	HS/SC	67.0	28.8	4.2
17-3024	Electro-mechanical technicians	Associate degree	HS/SC	28.8	54.5	16.7
17-3027	Mechanical engineering technicians	Associate degree	HS/SC	28.8	54.5	16.7
49-9092	Commercial divers ⁷	Moderate-term on-the-job training	HS/SC	63.2	28.2	8.6
47-4051	Highway maintenance workers	Moderate-term on-the-job training	HS/SC	74.9	23.2	1.9
49-2094	Electrical and electronics repairers, commercial and industrial equipment ⁵	Postsecondary vocational award	HS/SC	31.5	63.4	5.1
47-2031	Carpenters	Long-term on-the-job training	HS/SC	72.7	22.2	5.1
49-3042	Mobile heavy equipment mechanics, except engines	Postsecondary vocational award	HS/SC	63.2	31.1	5.7
33-3011	Bailiffs ²	Moderate-term on-the-job training	HS/SC	44.8	43.9	11.3
39-1021	First-line supervisors/managers of personal service workers	Work experience in a related occupation	HS/SC	45.6	39.7	14.8
51-4011	Computer-controlled machine tool operators, metal and plastic	Moderate-term on-the-job training	HS/SC	58.5	36.5	5.0
53-6041	Traffic technicians ⁴	Short-term on-the-job training	HS/SC	36.7	54.9	8.4
51-5021	Job printers	Long-term on-the-job training	HS/SC	66.5	27.0	6.5
43-6011	Executive secretaries and administrative assistants	Moderate-term on-the-job training	HS/SC	37.2	47.0	15.9
51-4081	Multiple machine tool setters, operators, and tenders, metal and plastic ⁷	Moderate-term on-the-job training	HS/SC	72.3	24.3	3.3
51-4041	Machinists	Long-term on-the-job training	HS/SC	63.9	32.4	3.7
47-5021	Earth drillers, except oil and gas	Moderate-term on-the-job training	HS/SC	78.4	20.5	1.2
17-3022	Civil engineering technicians	Associate degree	HS/SC	28.8	54.5	16.7
49-2093	Electrical and electronics installers and repairers, transportation equipment ⁷	Postsecondary vocational award	HS/SC	49.4	44.1	6.5
51-9197	Tire builders	Moderate-term on-the-job training	HS/SC	49.9	44.2	6.0
51-4199	All other metal workers and plastic workers	Moderate-term on-the-job training	HS/SC	75.7	21.5	2.7
43-3051	Payroll and timekeeping clerks	Moderate-term on-the-job training	HS/SC	37.9	46.8	15.2
49-9063	Musical instrument repairers and tuners ⁴	Long-term on-the-job training	HS/SC	36.0	49.0	15.0
51-2041	Structural metal fabricators and fitters	Moderate-term on-the-job training	HS/SC	79.3	20.7	.0
47-2142	Paperhangers ²	Moderate-term on-the-job training	HS/SC	57.9	34.9	7.2
49-9043	Maintenance workers, machinery	Short-term on-the-job training	HS/SC	72.6	25.3	2.2
49-9045	Refractory materials repairers, except brickmasons ⁴	Moderate-term on-the-job training	HS/SC	60.4	34.3	5.3
51-8099	All other plant and system operators ²	Long-term on-the-job training	HS/SC	57.6	37.5	4.9
53-5099	All other water transportation workers	Short-term on-the-job training	HS/SC	50.0	36.5	13.5
49-9041	Industrial machinery mechanics	Long-term on-the-job training	HS/SC	60.4	34.3	5.3
49-9031	Home appliance repairers	Long-term on-the-job training	HS/SC	69.9	25.4	4.7
49-2092	Electric motor, power tool, and related repairers	Postsecondary vocational award	HS/SC	49.4	43.7	6.9
51-5023	Printing machine operators	Moderate-term on-the-job training	HS/SC	70.6	25.3	4.1
49-3043	Rail car repairers ²	Long-term on-the-job training	HS/SC	65.8	29.5	4.7
53-5011	Sailors and marine oilers ²	Short-term on-the-job training	HS/SC	69.8	24.8	5.4
43-9041	Insurance claims and policy processing clerks	Moderate-term on-the-job training	HS/SC	39.4	44.4	16.2

See footnotes at end of table.

Table I-1. Educational attainment cluster, most significant source of postsecondary education or training, and educational attainment distribution, by occupation¹—Continued

(Employment in thousands)

2002 median annual earnings		Employment		Employment change, 2002–12		2002 national employment matrix occupation
Dollars	Rank ¹¹	2002	2012	Numeric	Percent	
\$37,220	H	9	10	1	15.6	53-1011 Aircraft cargo handling supervisors ⁴
30,760	H	13	15	2	15.6	51-4192 Lay-out workers, metal and plastic ⁷
31,410	H	59	68	9	15.5	43-5011 Cargo and freight agents
						49-3099 All other vehicle and mobile equipment mechanics, installers, and repairers
35,840	H	36	41	6	15.4	
29,580	H	202	233	31	15.2	53-3021 Bus drivers, transit and intercity
36,380	H	29	33	4	14.8	49-9062 Medical equipment repairers
38,000	H	9	10	1	14.6	51-4061 Model makers, metal and plastic ⁵
30,280	H	170	194	24	14.4	43-5032 Dispatchers, except police, fire, and ambulance
33,790	H	14	16	2	14.3	49-9096 Riggers ⁷
						49-3031 Bus and truck mechanics and diesel engine specialists
34,380	H	267	305	38	14.2	53-1021 First-line supervisors/managers of helpers, laborers, and material movers, hand
37,180	H	147	168	21	14.0	49-3021 Automotive body and related repairers
32,680	H	198	225	26	13.2	51-4012 Numerical tool and process control programmers ⁴
37,520	H	19	22	3	13.0	43-5031 Police, fire, and ambulance dispatchers
27,660	H	92	104	12	12.7	
30,590	H	818	919	101	12.4	49-3023 Automotive service technicians and mechanics
						49-9099 Installation, maintenance, and repair workers, all other
33,010	H	185	207	23	12.2	47-2151 Pipelayers
28,500	H	58	65	7	11.8	17-3024 Electro-mechanical technicians
38,120	H	31	35	4	11.5	17-3027 Mechanical engineering technicians
41,280	H	55	61	6	11.0	49-9092 Commercial divers ⁷
34,710	H	4	5	0	10.6	47-4051 Highway maintenance workers
28,390	H	154	170	16	10.4	49-2094 Electrical and electronics repairers, commercial and industrial equipment ⁵
41,110	H	85	94	9	10.4	47-2031 Carpenters
34,190	H	1,209	1,331	122	10.1	49-3042 Mobile heavy equipment mechanics, except engines
35,970	H	126	138	12	9.6	
32,710	H	15	16	1	9.5	33-3011 Bailiffs ²
						39-1021 First-line supervisors/managers of personal service workers
28,960	H	216	236	20	9.4	51-4011 Computer-controlled machine tool operators, metal and plastic
29,050	H	132	144	12	9.3	53-6041 Traffic technicians ⁴
31,650	H	6	6	1	9.3	51-5021 Job printers
30,100	H	56	61	5	9.2	43-6011 Executive secretaries and administrative assistants
33,410	H	1,526	1,658	132	8.7	51-4081 Multiple machine tool setters, operators, and tenders, metal and plastic ⁷
28,690	H	99	107	8	8.3	51-4041 Machinists
32,570	H	387	419	32	8.2	47-5021 Earth drillers, except oil and gas
32,490	H	23	25	2	7.7	17-3022 Civil engineering technicians
37,720	H	92	99	7	7.6	
						49-2093 Electrical and electronics installers and repairers, transportation equipment ⁷
38,610	H	18	19	1	7.1	51-9197 Tire builders
38,840	H	14	15	1	6.6	51-4199 All other metal workers and plastic workers
28,400	H	104	111	7	6.6	43-3051 Payroll and timekeeping clerks
29,000	H	198	211	13	6.5	49-9063 Musical instrument repairers and tuners ⁴
29,440	H	6	7	0	6.3	51-2041 Structural metal fabricators and fitters
28,620	H	89	94	6	6.2	47-2142 Paperhangers ²
31,650	H	20	21	1	5.9	49-9043 Maintenance workers, machinery
32,520	H	92	97	5	5.9	49-9045 Refractory materials repairers, except brickmasons ⁴
35,100	H	4	4	0	5.6	51-8099 All other plant and system operators ²
36,660	H	32	33	2	5.6	
30,520	H	4	4	0	5.6	53-5099 All other water transportation workers
37,980	H	197	208	11	5.5	49-9041 Industrial machinery mechanics
30,390	H	42	44	2	5.5	49-9031 Home appliance repairers
32,210	H	31	33	2	5.3	49-2092 Electric motor, power tool, and related repairers
29,010	H	199	208	9	4.6	51-5023 Printing machine operators
39,060	H	15	15	1	4.5	49-3043 Rail car repairers ²
28,370	H	27	28	1	4.0	53-5011 Sailors and marine oilers ²
28,870	H	266	276	10	3.6	43-9041 Insurance claims and policy processing clerks

See footnotes at end of table.

Table I-1. Educational attainment cluster, most significant source of postsecondary education or training, and educational attainment distribution, by occupation¹—Continued

(Employment in thousands)

2002 national employment matrix occupation	Most significant source of postsecondary education or training ⁶	Educational attainment cluster ¹⁰	Percent of workers aged 25 to 44, by educational attainment		
			High school or less	Some college	College or higher
51-9081 Dental laboratory technicians	Long-term on-the-job training	HS/SC	51.8	34.6	13.6
51-4062 Patternmakers, metal and plastic ⁵	Moderate-term on-the-job training	HS/SC	59.0	38.5	2.4
43-3031 Bookkeeping, accounting, and auditing clerks	Moderate-term on-the-job training	HS/SC	40.4	43.8	15.8
51-4032 Drilling and boring machine tool setters, operators, and tenders, metal and plastic ²	Moderate-term on-the-job training	HS/SC	72.9	23.1	4.0
51-5012 Bookbinders ⁴	Moderate-term on-the-job training	HS/SC	70.4	21.5	8.1
51-4122 Welding, soldering, and brazing machine setters, operators, and tenders	Moderate-term on-the-job training	HS/SC	74.6	23.2	2.2
51-9012 Separating, filtering, clarifying, precipitating, and still machine setters, operators, and tenders	Moderate-term on-the-job training	HS/SC	46.2	36.4	17.5
51-4034 Lathe and turning machine tool setters, operators, and tenders, metal and plastic	Moderate-term on-the-job training	HS/SC	77.4	20.9	1.7
43-5051 Postal service clerks	Short-term on-the-job training	HS/SC	43.8	41.5	14.7
43-5052 Postal service mail carriers	Short-term on-the-job training	HS/SC	52.0	40.2	7.8
51-2031 Engine and other machine assemblers ²	Short-term on-the-job training	HS/SC	70.5	26.0	3.5
51-9196 Paper goods machine setters, operators, and tenders ..	Moderate-term on-the-job training	HS/SC	75.0	22.8	2.2
51-9011 Chemical equipment operators and tenders	Moderate-term on-the-job training	HS/SC	46.2	36.4	17.5
51-9051 Furnace, kiln, oven, drier, and kettle operators and tenders	Moderate-term on-the-job training	HS/SC	71.2	23.0	5.7
53-7072 Pump operators, except wellhead pumpers ⁵	Moderate-term on-the-job training	HS/SC	52.2	38.8	9.0
51-9023 Mixing and blending machine setters, operators, and tenders	Moderate-term on-the-job training	HS/SC	67.9	28.6	3.6
43-3061 Procurement clerks	Short-term on-the-job training	HS/SC	55.7	30.9	13.4
47-5042 Mine cutting and channeling machine operators ³	Moderate-term on-the-job training	HS/SC	72.4	24.3	3.3
49-9061 Camera and photographic equipment repairers ⁴	Moderate-term on-the-job training	HS/SC	36.0	49.0	15.0
51-4194 Tool grinders, filers, and sharpeners ²	Moderate-term on-the-job training	HS/SC	68.4	22.5	9.1
51-2011 Aircraft structure, surfaces, rigging, and systems assemblers ⁷	Long-term on-the-job training	HS/SC	74.7	20.4	4.9
43-5053 Postal service mail sorters, processors, and processing machine operators	Short-term on-the-job training	HS/SC	44.5	40.7	14.7
47-5049 All other mining machine operators ⁴	Moderate-term on-the-job training	HS/SC	71.0	24.8	4.2
51-5022 Prepress technicians and workers	Long-term on-the-job training	HS/SC	57.1	30.0	12.9
47-4061 Rail-track laying and maintenance equipment operators ⁷	Moderate-term on-the-job training	HS/SC	61.5	28.9	9.6
53-7073 Wellhead pumpers ⁵	Moderate-term on-the-job training	HS/SC	52.2	38.8	9.0
43-5041 Meter readers, utilities	Short-term on-the-job training	HS/SC	57.2	38.8	4.1
53-6011 Bridge and lock tenders ⁷	Short-term on-the-job training	HS/SC	62.8	30.3	6.9
47-5041 Continuous mining machine operators ²	Moderate-term on-the-job training	HS/SC	70.7	25.7	3.5
43-2099 All other communications equipment operators ⁷	Short-term on-the-job training	HS/SC	53.5	38.5	8.0
49-2021 Radio mechanics ⁴	Postsecondary vocational award	HS/SC	40.8	48.2	11.0
43-2021 Telephone operators	Short-term on-the-job training	HS/SC	42.3	48.0	9.7
31-9092 Medical assistants	Moderate-term on-the-job training	HS/SC	36.6	49.8	13.5
29-2071 Medical records and health information technicians	Associate degree	HS/SC	35.5	48.1	16.4
29-2056 Veterinary technologists and technicians	Associate degree	HS/SC	33.7	54.0	12.3
31-9091 Dental assistants	Moderate-term on-the-job training	HS/SC	34.2	57.4	8.4
29-2041 Emergency medical technicians and paramedics	Postsecondary vocational award	HS/SC	24.4	62.9	12.7
43-4171 Receptionists and information clerks	Short-term on-the-job training	HS/SC	49.7	38.6	11.8
29-2052 Pharmacy technicians	Moderate-term on-the-job training	HS/SC	33.7	54.0	12.3
43-4111 Interviewers, except eligibility and loan	Short-term on-the-job training	HS/SC	30.1	50.3	19.6
31-9099 All other healthcare support workers	Short-term on-the-job training	HS/SC	36.6	49.8	13.5
39-3092 Costume attendants ⁴	Short-term on-the-job training	HS/SC	45.8	40.5	13.7
31-1012 Nursing aides, orderlies, and attendants	Short-term on-the-job training	HS/SC	62.7	31.4	5.9
33-9031 Gaming surveillance officers and gaming investigators ⁴	Moderate-term on-the-job training	HS/SC	52.5	34.7	12.8
43-3011 Bill and account collectors	Short-term on-the-job training	HS/SC	45.6	35.7	18.7
53-3033 Truck drivers, light or delivery services	Short-term on-the-job training	HS/SC	60.9	25.9	13.2
31-9094 Medical transcriptionists	Postsecondary vocational award	HS/SC	36.6	49.8	13.5
29-2051 Dietetic technicians	Moderate-term on-the-job training	HS/SC	33.7	54.0	12.3
39-5094 Skin care specialists	Postsecondary vocational award	HS/SC	58.6	32.8	8.7
53-2099 All other air transportation workers	Moderate-term on-the-job training	HS/SC	50.0	36.5	13.5

See footnotes at end of table.

Table I-1. Educational attainment cluster, most significant source of postsecondary education or training, and educational attainment distribution, by occupation¹—Continued

(Employment in thousands)

2002 median annual earnings		Employment		Employment change, 2002–12		2002 national employment matrix occupation	
Dollars	Rank ¹¹	2002	2012	Numeric	Percent		
\$28,500	H	47	49	2	3.6	51-9081	Dental laboratory technicians
33,470	H	6	7	0	3.6	51-4062	Patternmakers, metal and plastic ⁵
27,380	H	1,983	2,042	59	3.0	43-3031	Bookkeeping, accounting, and auditing clerks
27,530	H	53	54	1	2.1	51-4032	Drilling and boring machine tool setters, operators, and tenders, metal and plastic ²
27,680	H	7	7	0	1.3	51-5012	Bookbinders ⁴
28,900	H	61	62	1	.9	51-4122	Welding, soldering, and brazing machine setters, operators, and tenders
30,340	H	36	36	0	.8	51-9012	Separating, filtering, clarifying, precipitating, and still machine setters, operators, and tenders
30,270	H	75	75	1	.8	51-4034	Lathe and turning machine tool setters, operators, and tenders, metal and plastic
39,700	H	77	77	0	-.5	43-5051	Postal service clerks
39,530	H	334	333	-2	-.5	43-5052	Postal service mail carriers
29,170	H	50	49	-1	-1.9	51-2031	Engine and other machine assemblers ²
28,280	H	117	114	-3	-2.8	51-9196	Paper goods machine setters, operators, and tenders
37,430	H	58	56	-2	-3.8	51-9011	Chemical equipment operators and tenders
28,210	H	31	29	-2	-4.9	51-9051	Furnace, kiln, oven, drier, and kettle operators and tenders
36,470	H	13	13	-1	-5.0	53-7072	Pump operators, except wellhead pumpers ⁵
27,530	H	106	99	-7	-6.5	51-9023	Mixing and blending machine setters, operators, and tenders
29,600	H	77	72	-5	-6.7	43-3061	Procurement clerks
37,590	H	5	5	0	-7.1	47-5042	Mine cutting and channeling machine operators ³
31,390	H	7	6	0	-7.2	49-9061	Camera and photographic equipment repairers ⁴
29,400	H	26	24	-2	-7.7	51-4194	Tool grinders, filers, and sharpeners ²
38,910	H	27	24	-2	-9.4	51-2011	Aircraft structure, surfaces, rigging, and systems assemblers ⁷
38,150	H	253	226	-26	-10.5	43-5053	Postal service mail sorters, processors, and processing machine operators
38,780	H	4	4	0	-10.8	47-5049	All other mining machine operators ⁴
31,150	H	91	81	-10	-11.2	51-5022	Prepress technicians and workers
35,160	H	11	9	-1	-11.5	47-4061	Rail-track laying and maintenance equipment operators ⁷
33,770	H	11	10	-1	-11.7	53-7073	Wellhead pumpers ⁵
28,830	H	54	46	-8	-14.1	43-5041	Meter readers, utilities
35,310	H	4	3	-1	-17.4	53-6011	Bridge and lock tenders ⁷
34,850	H	8	7	-2	-18.5	47-5041	Continuous mining machine operators ²
31,640	H	18	14	-5	-24.6	43-2099	All other communications equipment operators ⁷
36,230	H	7	5	-2	-29.3	49-2021	Radio mechanics ⁴
28,600	H	50	22	-28	-56.3	43-2021	Telephone operators
23,940	L	365	579	215	58.9	31-9092	Medical assistants
23,890	L	147	216	69	46.8	29-2071	Medical records and health information technicians
22,950	L	53	76	23	44.1	29-2056	Veterinary technologists and technicians
27,240	L	266	379	113	42.5	31-9091	Dental assistants
24,030	L	179	238	59	33.1	29-2041	Emergency medical technicians and paramedics
21,150	L	1,100	1,425	325	29.5	43-4171	Receptionists and information clerks
22,250	L	211	271	61	28.8	29-2052	Pharmacy technicians
21,690	L	193	247	54	28.0	43-4111	Interviewers, except eligibility and loan
23,690	L	198	251	53	26.6	31-9099	All other healthcare support workers
24,160	L	4	5	1	25.1	39-3092	Costume attendants ⁴
19,960	L	1,375	1,718	343	24.9	31-1012	Nursing aides, orderlies, and attendants
23,110	L	9	11	2	24.6	33-9031	Gaming surveillance officers and gaming investigators ⁴
26,780	L	413	514	101	24.4	43-3011	Bill and account collectors
23,870	L	1,022	1,259	237	23.2	53-3033	Truck drivers, light or delivery services
27,140	L	101	124	23	22.6	31-9094	Medical transcriptionists
22,490	L	29	35	6	20.2	29-2051	Dietetic technicians
22,450	L	25	30	5	19.4	39-5094	Skin care specialists
23,330	L	12	14	2	19.4	53-2099	All other air transportation workers

See footnotes at end of table.

Table I-1. Educational attainment cluster, most significant source of postsecondary education or training, and educational attainment distribution, by occupation¹—Continued

(Employment in thousands)

2002 national employment matrix occupation	Most significant source of postsecondary education or training ⁵	Educational attainment cluster ¹⁰	Percent of workers aged 25 to 44, by educational attainment		
			High school or less	Some college	College or higher
49-3053 Outdoor power equipment and other small engine mechanics	Moderate-term on-the-job training	HS/SC	59.6	39.6	.7
49-3052 Motorcycle mechanics ³	Long-term on-the-job training	HS/SC	63.9	34.0	2.1
39-5091 Makeup artists, theatrical and performance ⁴	Postsecondary vocational award	HS/SC	58.6	32.8	8.7
29-2081 Opticians, dispensing	Long-term on-the-job training	HS/SC	22.2	60.1	17.7
31-9093 Medical equipment preparers	Short-term on-the-job training	HS/SC	36.6	49.8	13.5
51-9123 Painting, coating, and decorating workers	Short-term on-the-job training	HS/SC	76.7	20.8	2.5
43-6013 Medical secretaries	Postsecondary vocational award	HS/SC	37.2	47.0	15.9
37-2021 Pest control workers	Moderate-term on-the-job training	HS/SC	60.2	34.4	5.4
53-3022 Bus drivers, school	Short-term on-the-job training	HS/SC	63.9	29.2	7.0
35-1012 First-line supervisors/managers of food preparation and serving workers	Work experience in a related occupation	HS/SC	56.2	30.3	13.5
39-6012 Concierges ²	Moderate-term on-the-job training	HS/SC	51.9	36.1	12.0
49-9091 Coin, vending, and amusement machine servicers and repairers	Moderate-term on-the-job training	HS/SC	62.6	32.3	5.1
53-6099 All other related transportation workers ²	Short-term on-the-job training	HS/SC	44.5	49.2	6.3
49-2096 Electronic equipment installers and repairers, motor vehicles	Postsecondary vocational award	HS/SC	37.9	59.6	2.5
43-5111 Weighers, measurers, checkers, and samplers, recordkeeping	Short-term on-the-job training	HS/SC	56.4	30.6	13.0
43-3041 Gaming cage workers ⁷	Short-term on-the-job training	HS/SC	43.6	42.5	13.9
31-1013 Psychiatric aides	Short-term on-the-job training	HS/SC	62.7	31.4	5.9
33-9011 Animal control workers ⁷	Moderate-term on-the-job training	HS/SC	53.7	32.6	13.6
43-4031 Court, municipal, and license clerks	Short-term on-the-job training	HS/SC	39.9	46.1	14.0
51-9199 All other production workers	Moderate-term on-the-job training	HS/SC	74.3	21.0	4.7
51-3011 Bakers	Long-term on-the-job training	HS/SC	73.5	20.5	6.0
43-4141 New accounts clerks ²	Work experience in a related occupation	HS/SC	41.0	43.0	16.0
27-2031 Dancers ³	Long-term on-the-job training	HS/SC	57.5	33.5	9.0
43-9061 Office clerks, general	Short-term on-the-job training	HS/SC	40.9	42.4	16.7
53-7199 Material moving workers, all other	Moderate-term on-the-job training	HS/SC	73.7	22.3	4.1
43-3071 Tellers	Short-term on-the-job training	HS/SC	44.3	42.9	12.7
51-7011 Cabinetmakers and bench carpenters	Long-term on-the-job training	HS/SC	69.0	23.3	7.7
51-9121 Coating, painting, and spraying machine setters, operators, and tenders	Moderate-term on-the-job training	HS/SC	76.7	20.8	2.5
51-5099 All other printing workers	Moderate-term on-the-job training	HS/SC	70.6	25.3	4.1
51-9083 Ophthalmic laboratory technicians	Moderate-term on-the-job training	HS/SC	51.8	34.6	13.6
51-9022 Grinding and polishing workers, hand	Moderate-term on-the-job training	HS/SC	67.9	28.6	3.6
51-4072 Molding, coremaking, and casting machine setters, operators, and tenders, metal and plastic	Moderate-term on-the-job training	HS/SC	71.4	25.7	2.9
49-2097 Electronic home entertainment equipment installers and repairers	Postsecondary vocational award	HS/SC	59.4	33.4	7.1
43-3021 Billing and posting clerks and machine operators	Moderate-term on-the-job training	HS/SC	39.3	43.9	16.8
49-3041 Farm equipment mechanics	Postsecondary vocational award	HS/SC	63.2	31.1	5.7
51-4021 Extruding and drawing machine setters, operators, and tenders, metal and plastic	Moderate-term on-the-job training	HS/SC	76.3	23.6	.1
51-4031 Cutting, punching, and press machine setters, operators, and tenders, metal and plastic	Moderate-term on-the-job training	HS/SC	72.4	26.1	1.5
53-7062 Laborers and freight, stock, and material movers, hand	Short-term on-the-job training	HS/SC	73.8	21.7	4.5
51-9194 Etchers and engravers ²	Long-term on-the-job training	HS/SC	63.1	25.3	11.6
51-4022 Forging machine setters, operators, and tenders, metal and plastic ²	Moderate-term on-the-job training	HS/SC	76.6	23.4	.0
29-2053 Psychiatric technicians	Moderate-term on-the-job training	HS/SC	33.7	54.0	12.3
51-2091 Fiberglass laminators and fabricators	Moderate-term on-the-job training	HS/SC	73.8	21.2	5.0
51-9061 Inspectors, testers, sorters, samplers, and weighers	Moderate-term on-the-job training	HS/SC	52.9	33.7	13.4
51-9071 Jewelers and precious stone and metal workers	Postsecondary vocational award	HS/SC	61.5	24.8	13.7
53-3031 Driver/sales workers	Short-term on-the-job training	HS/SC	70.9	24.2	4.9
51-4071 Foundry mold and coremakers ²	Moderate-term on-the-job training	HS/SC	74.9	21.5	3.5
49-9064 Watch repairers ⁴	Long-term on-the-job training	HS/SC	36.0	49.0	15.0
43-5071 Shipping, receiving, and traffic clerks	Short-term on-the-job training	HS/SC	64.5	28.6	6.9
43-2011 Switchboard operators, including answering service	Short-term on-the-job training	HS/SC	54.6	34.0	11.4

See footnotes at end of table.

Table I-1. Educational attainment cluster, most significant source of postsecondary education or training, and educational attainment distribution, by occupation¹—Continued

(Employment in thousands)

2002 median annual earnings		Employment		Employment change, 2002–12		2002 national employment matrix occupation
Dollars	Rank ¹¹	2002	2012	Numeric	Percent	
\$24,820	L	30	36	6	18.9	49-3053 Outdoor power equipment and other small engine mechanics
27,100	L	15	18	3	18.7	49-3052 Motorcycle mechanics ³
24,730	L	2	2	0	18.2	39-5091 Makeup artists, theatrical and performance ⁴
25,600	L	63	75	11	18.2	29-2081 Opticians, dispensing
22,960	L	36	43	7	18.1	31-9093 Medical equipment preparers
21,200	L	34	40	6	17.6	51-9123 Painting, coating, and decorating workers
25,430	L	339	398	58	17.2	43-6013 Medical secretaries
24,760	L	62	72	10	17.0	37-2021 Pest control workers
22,390	L	453	528	76	16.7	53-3022 Bus drivers, school
24,390	L	692	800	107	15.5	35-1012 First-line supervisors/managers of food preparation and serving workers
21,720	L	17	20	3	15.3	39-6012 Concierges ²
27,380	L	43	49	6	15.2	49-9091 Coin, vending, and amusement machine servicers and repairers
26,600	L	40	47	6	15.2	53-6099 All other related transportation workers ²
26,010	L	18	21	3	14.8	49-2096 Electronic equipment installers and repairers, motor vehicles
24,170	L	81	93	12	14.6	43-5111 Weighers, measurers, checkers, and samplers, recordkeeping
21,780	L	18	21	3	14.5	43-3041 Gaming cage workers ⁷
22,970	L	59	68	9	14.5	31-1013 Psychiatric aides
24,780	L	11	12	1	12.6	33-9011 Animal control workers ⁷
27,300	L	106	119	13	12.3	43-4031 Court, municipal, and license clerks
22,260	L	449	500	51	11.3	51-9199 All other production workers
20,580	L	173	192	19	11.2	51-3011 Bakers
25,200	L	99	110	11	11.2	43-4141 New accounts clerks ²
21,100	L	20	22	2	11.1	27-2031 Dancers ³
22,280	L	2,991	3,301	310	10.4	43-9061 Office clerks, general
25,070	L	78	86	8	10.0	53-7199 Material moving workers, all other
20,400	L	530	580	50	9.4	43-3071 Tellers
24,000	L	147	160	14	9.4	51-7011 Cabinetmakers and bench carpenters
25,290	L	103	112	10	9.4	51-9121 Coating, painting, and spraying machine setters, operators, and tenders
23,330	L	21	23	2	9.3	51-5099 All other printing workers
21,760	L	33	36	3	9.2	51-9083 Ophthalmic laboratory technicians
22,970	L	45	49	4	9.0	51-9022 Grinding and polishing workers, hand
23,230	L	151	165	14	8.9	51-4072 Molding, coremaking, and casting machine setters, operators, and tenders, metal and plastic
27,200	L	43	46	4	8.6	49-2097 Electronic home entertainment equipment installers and repairers
26,110	L	507	547	40	7.9	43-3021 Billing and posting clerks and machine operators
27,100	L	35	38	3	7.7	49-3041 Farm equipment mechanics
25,870	L	98	105	7	7.1	51-4021 Extruding and drawing machine setters, operators, and tenders, metal and plastic
24,570	L	283	302	19	6.8	51-4031 Cutting, punching, and press machine setters, operators, and tenders, metal and plastic
19,710	L	2,231	2,378	147	6.6	53-7062 Laborers and freight, stock, and material movers, hand
22,450	L	10	10	1	6.2	51-9194 Etchers and engravers ²
26,300	L	45	48	3	6.0	51-4022 Forging machine setters, operators, and tenders, metal and plastic ²
25,710	L	60	63	4	5.9	29-2053 Psychiatric technicians
24,610	L	37	39	2	5.6	51-2091 Fiberglass laminators and fabricators
27,060	L	515	539	24	4.7	51-9061 Inspectors, testers, sorters, samplers, and weighers
26,260	L	40	42	2	4.5	51-9071 Jewelers and precious stone and metal workers
20,640	L	431	450	19	4.3	53-3031 Driver/sales workers
26,100	L	23	24	1	3.6	51-4071 Foundry mold and coremakers ²
26,560	L	5	5	0	3.5	49-9064 Watch repairers ⁴
23,420	L	803	827	24	3.0	43-5071 Shipping, receiving, and traffic clerks
21,190	L	236	236	1	.2	43-2011 Switchboard operators, including answering service

See footnotes at end of table.

Table I-1. Educational attainment cluster, most significant source of postsecondary education or training, and educational attainment distribution, by occupation¹—Continued

(Employment in thousands)

2002 national employment matrix occupation	Most significant source of postsecondary education or training ⁵	Educational attainment cluster ¹⁰	Percent of workers aged 25 to 44, by educational attainment		
			High school or less	Some college	College or higher
51-9041 Extruding, forming, pressing, and compacting machine setters, operators, and tenders	Moderate-term on-the-job training	HS/SC	69.5	26.0	4.5
51-2099 All other assemblers and fabricators	Moderate-term on-the-job training	HS/SC	73.8	21.2	5.0
43-4071 File clerks	Short-term on-the-job training	HS/SC	44.7	40.5	14.8
43-4021 Correspondence clerks ⁷	Short-term on-the-job training	HS/SC	44.3	41.0	14.7
51-2092 Team assemblers	Moderate-term on-the-job training	HS/SC	73.8	21.2	5.0
41-2022 Parts salespersons	Moderate-term on-the-job training	HS/SC	67.3	27.8	4.9
49-9093 Fabric menders, except garment ⁴	Moderate-term on-the-job training	HS/SC	62.3	25.6	12.1
51-9021 Crushing, grinding, and polishing machine setters, operators, and tenders	Moderate-term on-the-job training	HS/SC	67.9	28.6	3.6
43-6014 Secretaries, except legal, medical, and executive	Moderate-term on-the-job training	HS/SC	37.2	47.0	15.9
43-9051 Mail clerks and mail machine operators, except postal service	Short-term on-the-job training	HS/SC	56.9	36.0	7.1
51-2093 Timing device assemblers, adjusters, and calibrators ⁴	Moderate-term on-the-job training	HS/SC	73.8	21.2	5.0
43-9071 Office machine operators, except computer	Short-term on-the-job training	HS/SC	58.3	31.9	9.9
51-5011 Bindery workers	Short-term on-the-job training	HS/SC	70.4	21.5	8.1
43-9021 Data entry keyers	Moderate-term on-the-job training	HS/SC	45.1	41.0	13.9
43-4151 Order clerks	Short-term on-the-job training	HS/SC	51.6	36.5	11.8
43-4041 Credit authorizers, checkers, and clerks	Short-term on-the-job training	HS/SC	33.0	48.9	18.1
43-5199 All other material recording, scheduling, dispatching, and distributing workers	Short-term on-the-job training	HS/SC	65.4	26.0	8.6
51-2023 Electromechanical equipment assemblers	Short-term on-the-job training	HS/SC	72.6	21.6	5.8
51-6052 Tailors, dressmakers, and custom sewers	Long-term on-the-job training	HS/SC	63.1	24.2	12.7
51-9141 Semiconductor processors ⁷	Associate degree	HS/SC	68.7	23.9	7.5
51-2021 Coil winders, tapers, and finishers	Short-term on-the-job training	HS/SC	72.6	21.6	5.8
51-2022 Electrical and electronic equipment assemblers	Short-term on-the-job training	HS/SC	72.6	21.6	5.8
11-9012 Farmers and ranchers	Long-term on-the-job training	HS/SC	54.7	28.7	16.6
43-9022 Word processors and typists	Moderate-term on-the-job training	HS/SC	37.6	48.2	14.2
31-1011 Home health aides	Short-term on-the-job training	HS/SC	62.7	31.4	5.9
39-9021 Personal and home care aides	Short-term on-the-job training	HS/SC	59.6	32.1	8.2
33-9032 Security guards	Short-term on-the-job training	HS/SC	52.5	34.7	12.8
39-3091 Amusement and recreation attendants	Short-term on-the-job training	HS/SC	45.8	40.5	13.7
53-3011 Ambulance drivers and attendants, except emergency medical technicians ⁷	Moderate-term on-the-job training	HS/SC	69.5	24.9	5.6
39-3093 Locker room, coatroom, and dressing room attendants ³	Short-term on-the-job training	HS/SC	56.9	34.0	9.1
31-9096 Veterinary assistants and laboratory animal caretakers	Short-term on-the-job training	HS/SC	36.6	49.8	13.5
39-3011 Gaming dealers	Postsecondary vocational award	HS/SC	51.4	35.3	13.3
39-3012 Gaming and sports book writers and runners ⁴	Postsecondary vocational award	HS/SC	51.4	35.3	13.3
41-2012 Gaming change persons and booth cashiers ²	Short-term on-the-job training	HS/SC	66.7	24.7	8.6
43-4081 Hotel, motel, and resort desk clerks	Short-term on-the-job training	HS/SC	45.3	38.8	16.0
25-9041 Teacher assistants	Short-term on-the-job training	HS/SC	43.7	40.0	16.3
39-5092 Manicurists and pedicurists	Postsecondary vocational award	HS/SC	58.6	32.8	8.7
39-2021 Nonfarm animal caretakers	Short-term on-the-job training	HS/SC	55.6	31.7	12.7
53-3041 Taxi drivers and chauffeurs	Short-term on-the-job training	HS/SC	60.9	25.9	13.2
39-3199 All other gaming service workers	Moderate-term on-the-job training	HS/SC	51.4	35.3	13.3
31-9095 Pharmacy aides	Short-term on-the-job training	HS/SC	36.6	49.8	13.5
35-3031 Waiters and waitresses	Short-term on-the-job training	HS/SC	55.2	32.3	12.5
35-3022 Counter attendants, cafeteria, food concession, and coffee shop	Short-term on-the-job training	HS/SC	72.0	20.1	7.9
39-5093 Shampooers	Short-term on-the-job training	HS/SC	58.6	32.8	8.7
33-9091 Crossing guards	Short-term on-the-job training	HS/SC	76.0	23.3	.6
35-9031 Hosts and hostesses, restaurant, lounge, and coffee shop	Short-term on-the-job training	HS/SC	48.1	32.3	19.6
39-3031 Ushers, lobby attendants, and ticket takers ²	Short-term on-the-job training	HS/SC	49.8	30.9	19.3
39-5012 Hairdressers, hairstylists, and cosmetologists	Postsecondary vocational award	HS/SC	55.7	40.2	4.1
39-6011 Baggage porters and bellhops	Short-term on-the-job training	HS/SC	44.5	45.8	9.6
41-2011 Cashiers, except gaming	Short-term on-the-job training	HS/SC	66.1	25.6	8.3
39-9011 Child care workers	Short-term on-the-job training	HS/SC	52.9	34.4	12.7

See footnotes at end of table.

Table I-1. Educational attainment cluster, most significant source of postsecondary education or training, and educational attainment distribution, by occupation¹—Continued

(Employment in thousands)

2002 median annual earnings		Employment		Employment change, 2002–12		2002 national employment matrix occupation
Dollars	Rank ¹¹	2002	2012	Numeric	Percent	
\$26,540	L	73	73	0	-.1	51-9041 Extruding, forming, pressing, and compacting machine setters, operators, and tenders
22,890	L	361	360	-1	-.2	51-2099 All other assemblers and fabricators
20,020	L	265	264	-1	-.3	43-4071 File clerks
25,960	L	33	33	0	-1.4	43-4021 Correspondence clerks ⁷
22,680	L	1,174	1,155	-19	-1.6	51-2092 Team assemblers
23,950	L	248	243	-5	-2.0	41-2022 Parts salespersons
25,690	L	2	2	0	-2.2	49-9093 Fabric menders, except garment ⁴
26,690	L	45	44	-1	-2.8	51-9021 Crushing, grinding, and polishing machine setters, operators, and tenders
25,290	L	1,975	1,918	-57	-2.9	43-6014 Secretaries, except legal, medical, and executive
21,190	L	170	165	-5	-2.9	43-9051 Mail clerks and mail machine operators, except postal service
24,190	L	7	6	0	-3.0	51-2093 Timing device assemblers, adjusters, and calibrators ⁴
21,770	L	96	91	-4	-4.6	43-9071 Office machine operators, except computer
21,860	L	91	86	-5	-5.2	51-5011 Bindery workers
22,390	L	392	371	-21	-5.4	43-9021 Data entry keyers
24,810	L	330	311	-19	-5.7	43-4151 Order clerks
26,690	L	80	74	-5	-6.7	43-4041 Credit authorizers, checkers, and clerks
25,890	L	34	32	-2	-6.9	43-5199 All other material recording, scheduling, dispatching, and distributing workers
25,260	L	60	55	-5	-8.3	51-2023 Electromechanical equipment assemblers
22,220	L	53	48	-5	-9.1	51-6052 Tailors, dressmakers, and custom sewers
27,340	L	46	42	-5	-10.6	51-9141 Semiconductor processors ⁷
23,020	L	36	31	-5	-13.9	51-2021 Coil winders, tapers, and finishers
22,940	L	281	230	-51	-18.3	51-2022 Electrical and electronic equipment assemblers
24,076	L	1,158	920	-238	-20.6	11-9012 Farmers and ranchers
26,730	L	241	148	-93	-38.6	43-9022 Word processors and typists
18,090	VL	580	859	279	48.1	31-1011 Home health aides
16,250	VL	608	854	246	40.5	39-9021 Personal and home care aides
19,140	VL	995	1,313	317	31.8	33-9032 Security guards
14,920	VL	234	299	65	27.8	39-3091 Amusement and recreation attendants
19,100	VL	17	22	5	26.7	53-3011 Ambulance drivers and attendants, except emergency medical technicians ⁷
16,930	VL	23	29	6	26.5	39-3093 Locker room, coatroom, and dressing room attendants ³
17,790	VL	63	79	16	26.2	31-9096 Veterinary assistants and laboratory animal caretakers
14,090	VL	78	97	19	24.7	39-3011 Gaming dealers
18,660	VL	14	18	3	24.4	39-3012 Gaming and sports book writers and runners ⁴
19,600	VL	33	41	8	24.1	41-2012 Gaming change persons and booth cashiers ²
17,370	VL	178	220	42	23.9	43-4081 Hotel, motel, and resort desk clerks
18,660	VL	1,277	1,571	294	23.0	25-9041 Teacher assistants
17,330	VL	51	63	12	22.7	39-5092 Manicurists and pedicurists
17,080	VL	125	153	28	22.2	39-2021 Nonfarm animal caretakers
18,530	VL	132	161	29	21.7	53-3041 Taxi drivers and chauffeurs
17,970	VL	40	49	9	21.3	39-3199 All other gaming service workers
18,430	VL	60	71	11	17.6	31-9095 Pharmacy aides
14,150	VL	2,097	2,464	367	17.5	35-3031 Waiters and waitresses
15,230	VL	467	545	78	16.7	35-3022 Counter attendants, cafeteria, food concession, and coffee shop
14,360	VL	25	29	4	16.6	39-5093 Shampoos
18,680	VL	74	86	12	16.5	33-9091 Crossing guards
15,310	VL	298	347	49	16.4	35-9031 Hosts and hostesses, restaurant, lounge, and coffee shop
14,600	VL	105	121	16	15.5	39-3031 Ushers, lobby attendants, and ticket takers ²
18,960	VL	585	671	86	14.7	39-5012 Hairdressers, hairstylists, and cosmetologists
17,860	VL	58	67	8	14.4	39-6011 Baggage porters and bellhops
15,420	VL	3,432	3,886	454	13.2	41-2011 Cashiers, except gaming
16,350	VL	1,211	1,353	142	11.7	39-9011 Child care workers

See footnotes at end of table.

Table I-1. Educational attainment cluster, most significant source of postsecondary education or training, and educational attainment distribution, by occupation¹—Continued

(Employment in thousands)

2002 national employment matrix occupation	Most significant source of postsecondary education or training ⁶	Educational attainment cluster ¹⁰	Percent of workers aged 25 to 44, by educational attainment		
			High school or less	Some college	College or higher
35-3041 Food servers, nonrestaurant	Short-term on-the-job training	HS/SC	70.2	24.1	5.6
35-3011 Bartenders	Short-term on-the-job training	HS/SC	49.2	37.9	12.9
39-5011 Barbers	Postsecondary vocational award	HS/SC	59.7	38.6	1.7
43-5021 Couriers and messengers	Short-term on-the-job training	HS/SC	53.2	36.6	10.2
53-6031 Service station attendants	Short-term on-the-job training	HS/SC	67.8	26.4	5.9
39-3021 Motion picture projectionists ⁷	Short-term on-the-job training	HS/SC	56.4	33.4	10.2
43-5081 Stock clerks and order fillers	Short-term on-the-job training	HS/SC	65.4	26.0	8.6
41-9041 Telemarketers	Short-term on-the-job training	HS/SC	54.8	33.6	11.6
51-6041 Shoe and leather workers and repairers ²	Long-term on-the-job training	HS/SC	70.2	20.3	9.5
51-6051 Sewers, hand	Short-term on-the-job training	HS/SC	63.1	24.2	12.7
31-2011 Occupational therapist assistants ⁷	Associate degree	SC	19.9	63.0	17.1
31-2012 Occupational therapist aides ⁷	Short-term on-the-job training	SC	19.9	63.0	17.1
11-3011 Administrative services managers	Bachelor's plus experience ⁹	HS/SC/C	22.6	36.8	40.6
11-3071 Transportation, storage, and distribution managers	Work experience in a related occupation	HS/SC/C	49.0	28.8	22.2
41-4011 Sales representatives, wholesale and manufacturing, technical and scientific products	Moderate-term on-the-job training	HS/SC/C	24.5	27.0	48.5
41-4012 Sales representatives, wholesale and manufacturing, except technical and scientific products	Moderate-term on-the-job training	HS/SC/C	24.5	27.0	48.5
33-1011 First-line supervisors/managers of correctional officers	Work experience in a related occupation	HS/SC/C	27.7	46.6	25.8
29-2091 Orthotists and prosthetists ⁴	Bachelor's degree	HS/SC/C	31.0	47.0	22.0
13-1051 Cost estimators	Work experience in a related occupation	HS/SC/C	32.8	38.4	28.8
11-1021 General and operations managers	Bachelor's plus experience ⁹	HS/SC/C	21.3	30.4	48.4
13-2099 All other financial specialists	Bachelor's degree	HS/SC/C	25.2	29.6	45.2
39-6031 Flight attendants	Long-term on-the-job training	HS/SC/C	25.3	37.9	36.7
33-3052 Transit and railroad police ⁷	Long-term on-the-job training	HS/SC/C	21.0	52.1	26.9
13-1031 Claims adjusters, examiners, and investigators	Long-term on-the-job training	HS/SC/C	24.1	32.2	43.7
11-9021 Construction managers	Bachelor's degree	HS/SC/C	41.4	30.6	28.0
13-1032 Insurance appraisers, auto damage	Long-term on-the-job training	HS/SC/C	24.1	32.2	43.7
13-1023 Purchasing agents, except wholesale, retail, and farm products	Work experience in a related occupation	HS/SC/C	29.4	33.7	36.9
13-2053 Insurance underwriters	Bachelor's degree	HS/SC/C	21.3	25.8	53.0
19-1010 Agricultural and food scientists	Bachelor's degree	HS/SC/C	25.7	12.0	62.3
11-3051 Industrial production managers	Bachelor's degree	HS/SC/C	29.8	29.7	40.5
41-1012 First-line supervisors/managers of non-retail sales workers	Work experience in a related occupation	HS/SC/C	34.9	28.7	36.4
11-9199 All other managers	Work experience in a related occupation	HS/SC/C	24.7	27.3	48.0
11-9011 Farm, ranch, and other agricultural managers	Bachelor's plus experience ⁹	HS/SC/C	48.0	30.6	21.4
41-9021 Real estate brokers	Work experience in a related occupation	HS/SC/C	22.2	37.0	40.7
19-4051 Nuclear technicians ⁷	Associate degree	HS/SC/C	26.8	39.0	34.2
11-9131 Postmasters and mail superintendents	Work experience in a related occupation	HS/SC/C	21.3	30.4	48.4
19-4091 Environmental science and protection technicians, including health	Associate degree	HS/SC/C	20.7	33.6	45.7
25-2012 Kindergarten teachers, except special education	Bachelor's degree	HS/SC/C	21.7	31.0	47.2
29-9199 All other health practitioners and technical workers	Postsecondary vocational award	HS/SC/C	31.0	47.0	22.0
27-4011 Audio and video equipment technicians	Long-term on-the-job training	HS/SC/C	22.7	40.9	36.4
27-4014 Sound engineering technicians ²	Postsecondary vocational award	HS/SC/C	25.0	41.7	33.3
41-9098 All other sales and related workers	Moderate-term on-the-job training	HS/SC/C	22.4	30.5	47.1
33-1099 All other first-line supervisors/managers, protective service workers	Work experience in a related occupation	HS/SC/C	31.1	46.2	22.8
19-4021 Biological technicians	Associate degree	HS/SC/C	24.6	16.4	59.0
43-4161 Human resources assistants, except payroll and timekeeping	Short-term on-the-job training	HS/SC/C	28.8	48.8	22.4
19-4092 Forensic science technicians ⁴	Associate degree	HS/SC/C	20.7	33.6	45.7
29-1031 Dietitians and nutritionists	Bachelor's degree	HS/SC/C	28.9	13.6	57.5
19-4098 All other life, physical, and social science technicians	Associate degree	HS/SC/C	20.7	33.6	45.7
27-2042 Musicians and singers	Long-term on-the-job training	HS/SC/C	21.0	26.1	52.9
27-2099 All other entertainers and performers, sports and related workers	Long-term on-the-job training	HS/SC/C	34.4	25.4	40.2
39-1011 Gaming supervisors	Work experience in a related occupation	HS/SC/C	35.4	31.5	33.1

See footnotes at end of table.

Table I-1. Educational attainment cluster, most significant source of postsecondary education or training, and educational attainment distribution, by occupation¹—Continued

(Employment in thousands)

2002 median annual earnings		Employment		Employment change, 2002–12		2002 national employment matrix occupation	
Dollars	Rank ¹¹	2002	2012	Numeric	Percent		
\$15,640	VL	195	215	20	10.4	35-3041	Food servers, nonrestaurant
15,000	VL	463	503	40	8.6	35-3011	Bartenders
19,550	VL	66	70	4	6.4	39-5011	Barbers
19,390	VL	132	138	5	4.0	43-5021	Couriers and messengers
16,570	VL	107	111	4	3.3	53-6031	Service station attendants
16,580	VL	9	9	0	.4	39-3021	Motion picture projectionists ⁷
19,270	VL	1,628	1,560	-68	-4.2	43-5081	Stock clerks and order fillers
19,550	VL	428	406	-21	-4.9	41-9041	Telemarketers
19,010	VL	16	14	-3	-16.1	51-6041	Shoe and leather workers and repairers ²
18,070	VL	36	29	-8	-21.2	51-6051	Sewers, hand
36,660	H	18	26	7	39.2	31-2011	Occupational therapist assistants ⁷
22,040	L	8	12	4	42.6	31-2012	Occupational therapist aides ⁷
52,500	VH	321	384	63	19.8	11-3011	Administrative services managers
59,660	VH	111	133	22	19.7	11-3071	Transportation, storage, and distribution managers
55,740	VH	398	475	77	19.3	41-4011	Sales representatives, wholesale and manufacturing, technical and scientific products
42,730	VH	1,459	1,738	279	19.2	41-4012	Sales representatives, wholesale and manufacturing, except technical and scientific products
44,940	VH	33	40	6	19.0	33-1011	First-line supervisors/managers of correctional officers
46,260	VH	5	6	1	18.9	29-2091	Orthotists and prosthetists ⁴
47,550	VH	188	223	35	18.6	13-1051	Cost estimators
68,210	VH	2,049	2,425	376	18.4	11-1021	General and operations managers
44,140	VH	162	190	28	17.6	13-2099	All other financial specialists
43,140	VH	104	121	17	16.0	39-6031	Flight attendants
43,710	VH	6	7	1	15.9	33-3052	Transit and railroad police ⁷
43,020	VH	227	260	32	14.2	13-1031	Claims adjusters, examiners, and investigators
63,500	VH	389	435	47	12.0	11-9021	Construction managers
42,630	VH	14	16	2	11.7	13-1032	Insurance appraisers, auto damage
45,090	VH	245	273	27	11.2	13-1023	Purchasing agents, except wholesale, retail, and farm products
45,590	VH	102	112	10	10.0	13-2053	Insurance underwriters
48,670	VH	18	20	2	9.1	19-1010	Agricultural and food scientists
67,320	VH	182	197	14	7.9	11-3051	Industrial production managers
53,020	VH	597	637	41	6.8	41-1012	First-line supervisors/managers of non-retail sales workers
66,890	VH	1,256	1,325	69	5.5	11-9199	All other managers
43,740	VH	218	229	11	5.1	11-9011	Farm, ranch, and other agricultural managers
50,330	VH	99	101	2	2.4	41-9021	Real estate brokers
59,990	VH	6	6	0	1.5	19-4051	Nuclear technicians ⁷
48,540	VH	25	25	0	-.5	11-9131	Postmasters and mail superintendents
35,320	H	28	38	10	36.8	19-4091	Environmental science and protection technicians, including health
39,810	H	168	214	46	27.2	25-2012	Kindergarten teachers, except special education
31,690	H	190	241	52	27.2	29-9199	All other health practitioners and technical workers
31,110	H	42	53	11	26.8	27-4011	Audio and video equipment technicians
36,970	H	13	16	3	25.5	27-4014	Sound engineering technicians ²
35,170	H	577	717	140	24.3	41-9098	All other sales and related workers
34,320	H	56	70	13	23.9	33-1099	All other first-line supervisors/managers, protective service workers
32,710	H	48	57	9	19.4	19-4021	Biological technicians
30,410	H	174	207	33	19.2	43-4161	Human resources assistants, except payroll and timekeeping
41,040	H	8	10	2	18.9	19-4092	Forensic science technicians ⁴
41,170	H	49	58	9	17.8	29-1031	Dietitians and nutritionists
34,030	H	137	162	24	17.5	19-4098	All other life, physical, and social science technicians
36,290	H	161	189	27	17.1	27-2042	Musicians and singers
33,740	H	56	65	9	16.4	27-2099	All other entertainers and performers, sports and related workers
39,290	H	39	45	6	15.7	39-1011	Gaming supervisors

See footnotes at end of table.

Table I-1. Educational attainment cluster, most significant source of postsecondary education or training, and educational attainment distribution, by occupation¹—Continued

(Employment in thousands)

2002 national employment matrix occupation	Most significant source of postsecondary education or training ⁵	Educational attainment cluster ¹⁰	Percent of workers aged 25 to 44, by educational attainment		
			High school or less	Some college	College or higher
49-2011 Computer, automated teller, and office machine repairers	Postsecondary vocational award	HS/SC/C	27.6	50.3	22.0
43-5061 Production, planning, and expediting clerks	Short-term on-the-job training	HS/SC/C	37.0	35.2	27.8
47-4011 Construction and building inspectors	Work experience in a related occupation	HS/SC/C	35.6	41.9	22.4
27-2041 Music directors and composers	Bachelor's plus experience ⁹	HS/SC/C	21.0	26.1	52.9
41-3011 Advertising sales agents	Moderate-term on-the-job training	HS/SC/C	20.6	28.6	50.8
11-9141 Property, real estate, and community association managers	Bachelor's degree	HS/SC/C	29.1	33.3	37.7
23-2091 Court reporters	Postsecondary vocational award	HS/SC/C	25.2	41.1	33.6
11-9051 Food service managers	Work experience in a related occupation	HS/SC/C	42.9	32.6	24.4
33-3041 Parking enforcement workers ⁷	Short-term on-the-job training	HS/SC/C	28.7	47.3	24.0
27-4012 Broadcast technicians	Associate degree	HS/SC/C	22.7	40.9	36.4
13-1021 Purchasing agents and buyers, farm products ²	Work experience in a related occupation	HS/SC/C	55.3	20.1	24.6
19-4011 Agricultural and food science technicians	Associate degree	HS/SC/C	34.4	26.4	39.3
41-1011 First-line supervisors/managers of retail sales workers	Work experience in a related occupation	HS/SC/C	41.1	34.4	24.5
41-3021 Insurance sales agents	Bachelor's degree	HS/SC/C	22.6	34.0	43.4
39-4011 Embalmers ⁶	Postsecondary vocational award	HS/SC/C	37.1	42.3	20.6
23-9099 All other legal and related workers	Bachelor's degree	HS/SC/C	25.2	41.1	33.6
33-3031 Fish and game wardens ⁷	Long-term on-the-job training	HS/SC/C	28.7	47.3	24.0
45-2011 Agricultural inspectors ²	Work experience in a related occupation	HS/SC/C	36.6	31.4	32.0
43-1011 First-line supervisors/managers of office and administrative support workers	Work experience in a related occupation	HS/SC/C	33.1	39.5	27.3
11-9081 Lodging managers	Work experience in a related occupation	HS/SC/C	30.6	21.9	47.5
41-9022 Real estate sales agents	Postsecondary vocational award	HS/SC/C	22.2	37.0	40.7
19-4031 Chemical technicians	Associate degree	HS/SC/C	31.7	39.7	28.7
13-1022 Wholesale and retail buyers, except farm products	Work experience in a related occupation	HS/SC/C	30.4	34.6	35.0
19-4093 Forest and conservation technicians ²	Associate degree	HS/SC/C	23.2	36.7	40.1
23-2092 Law clerks	Bachelor's degree	HS/SC/C	25.2	41.1	33.6
19-4041 Geological and petroleum technicians ²	Associate degree	HS/SC/C	29.2	43.5	27.3
43-4999 All other financial, information, and record clerks	Short-term on-the-job training	HS/SC/C	26.8	50.3	22.9
23-2093 Title examiners, abstractors, and searchers	Moderate-term on-the-job training	HS/SC/C	25.2	41.1	33.6
27-4013 Radio operators ⁴	Moderate-term on-the-job training	HS/SC/C	22.7	40.9	36.4
43-9111 Statistical assistants ²	Moderate-term on-the-job training	HS/SC/C	35.6	35.8	28.6
43-4061 Eligibility interviewers, government programs	Moderate-term on-the-job training	HS/SC/C	20.4	50.8	28.8
43-4131 Loan interviewers and clerks	Short-term on-the-job training	HS/SC/C	33.3	42.8	23.9
43-4011 Brokerage clerks ²	Moderate-term on-the-job training	HS/SC/C	31.7	40.4	27.9
43-9011 Computer operators	Moderate-term on-the-job training	HS/SC/C	39.1	40.5	20.4
39-9031 Fitness trainers and aerobics instructors	Postsecondary vocational award	HS/SC/C	22.0	30.6	47.4
39-9041 Residential advisors	Moderate-term on-the-job training	HS/SC/C	31.8	43.2	24.9
43-4051 Customer service representatives	Moderate-term on-the-job training	HS/SC/C	38.3	40.3	21.4
41-9011 Demonstrators and product promoters	Moderate-term on-the-job training	HS/SC/C	26.5	38.3	35.2
25-4031 Library technicians ²	Short-term on-the-job training	HS/SC/C	23.0	34.6	42.3
39-1012 Slot key persons	Postsecondary vocational award	HS/SC/C	35.4	31.5	33.1
41-9012 Models ⁴	Moderate-term on-the-job training	HS/SC/C	26.5	38.3	35.2
33-9095 All other protective service workers	Short-term on-the-job training	HS/SC/C	39.9	37.0	23.1
39-2011 Animal trainers	Moderate-term on-the-job training	HS/SC/C	47.5	28.3	24.2
43-4181 Reservation and transportation ticket agents and travel clerks	Short-term on-the-job training	HS/SC/C	31.6	45.3	23.1
51-9131 Photographic process workers	Moderate-term on-the-job training	HS/SC/C	41.6	32.8	25.5
51-7042 Woodworking machine setters, operators, and tenders, except sawing	Moderate-term on-the-job training	HS/SC/C	66.5	11.5	22.0
51-7099 All other woodworkers	Moderate-term on-the-job training	HS/SC/C	56.9	22.7	20.4
39-6022 Travel guides ⁴	Moderate-term on-the-job training	HS/SC/C	41.7	23.7	34.7
43-9999 All other secretaries, administrative assistants, and other office support workers	Short-term on-the-job training	HS/SC/C	29.5	37.8	32.6
43-9081 Proofreaders and copy markers ²	Short-term on-the-job training	HS/SC/C	32.3	33.7	34.0
27-3010 Announcers	Long-term on-the-job training	HS/SC/C	45.3	31.6	23.0
41-9091 Door-to-door sales workers, news and street vendors, and related workers	Short-term on-the-job training	HS/SC/C	46.1	31.3	22.6

See footnotes at end of table.

Table I-1. Educational attainment cluster, most significant source of postsecondary education or training, and educational attainment distribution, by occupation¹—Continued

(Employment in thousands)

2002 median annual earnings		Employment		Employment change, 2002–12		2002 national employment matrix occupation
Dollars	Rank ¹¹	2002	2012	Numeric	Percent	
\$33,250	H	156	180	24	15.0	49-2011 Computer, automated teller, and office machine repairers
33,650	H	288	328	40	14.0	43-5061 Production, planning, and expediting clerks
41,620	H	84	95	12	13.8	47-4011 Construction and building inspectors
31,310	H	54	62	7	13.5	27-2041 Music directors and composers
37,670	H	157	178	21	13.4	41-3011 Advertising sales agents
36,880	H	293	330	37	12.8	11-9141 Property, real estate, and community association managers
41,550	H	18	20	2	12.7	23-2091 Court reporters
35,790	H	386	430	44	11.5	11-9051 Food service managers
28,110	H	11	12	1	11.5	33-3041 Parking enforcement workers ⁷
27,760	H	35	39	4	11.3	27-4012 Broadcast technicians
40,900	H	19	21	2	10.2	13-1021 Purchasing agents and buyers, farm products ²
28,580	H	20	22	2	9.3	19-4011 Agricultural and food science technicians
29,700	H	1,798	1,962	163	9.1	41-1011 First-line supervisors/managers of retail sales workers
40,750	H	381	413	32	8.4	41-3021 Insurance sales agents
34,240	H	7	7	1	8.3	39-4011 Embalmers ⁶
38,700	H	101	109	8	7.6	23-9099 All other legal and related workers
41,010	H	8	8	1	7.1	33-3031 Fish and game wardens ⁷
28,620	H	16	17	1	6.8	45-2011 Agricultural inspectors ²
38,820	H	1,459	1,555	96	6.6	43-1011 First-line supervisors/managers of office and administrative support workers
33,970	H	69	73	5	6.6	11-9081 Lodging managers
30,930	H	308	325	18	5.7	41-9022 Real estate sales agents
37,430	H	69	72	3	4.6	19-4031 Chemical technicians
40,780	H	155	162	7	4.3	13-1022 Wholesale and retail buyers, except farm products
30,980	H	19	20	1	4.0	19-4093 Forest and conservation technicians ²
30,460	H	48	50	2	3.8	23-2092 Law clerks
39,430	H	11	11	0	1.3	19-4041 Geological and petroleum technicians ²
30,030	H	304	306	2	.5	43-4999 All other financial, information, and record clerks
32,610	H	55	53	-1	-2.7	23-2093 Title examiners, abstractors, and searchers
31,530	H	3	3	0	-6.2	27-4013 Radio operators ⁴
29,470	H	23	22	-2	-7.2	43-9111 Statistical assistants ²
31,010	H	94	83	-11	-11.6	43-4061 Eligibility interviewers, government programs
27,830	H	170	146	-24	-14.3	43-4131 Loan interviewers and clerks
33,210	H	78	67	-11	-14.7	43-4011 Brokerage clerks ²
29,650	H	182	151	-30	-16.8	43-9011 Computer operators
23,950	L	183	264	81	44.4	39-9031 Fitness trainers and aerobics instructors
20,700	L	53	71	18	33.6	39-9041 Residential advisors
26,240	L	1,894	2,354	460	24.3	43-4051 Customer service representatives
20,380	L	175	204	30	17.0	41-9011 Demonstrators and product promoters
24,090	L	119	139	20	16.8	25-4031 Library technicians ²
22,870	L	21	24	3	14.8	39-1012 Slot key persons
21,400	L	5	5	1	14.5	41-9012 Models ⁴
23,410	L	237	271	34	14.3	33-9095 All other protective service workers
22,950	L	26	30	4	14.3	39-2011 Animal trainers
25,350	L	177	199	22	12.2	43-4181 Reservation and transportation ticket agents and travel clerks
20,220	L	28	30	2	5.4	51-9131 Photographic process workers
22,030	L	95	98	3	3.0	51-7042 Woodworking machine setters, operators, and tenders, except sawing
21,020	L	29	29	0	1.7	51-7099 All other woodworkers
26,110	L	6	6	0	-.3	39-6022 Travel guides ⁴
25,840	L	435	431	-4	-.9	43-9999 All other secretaries, administrative assistants, and other office support workers
24,280	L	27	26	-1	-4.8	43-9081 Proofreaders and copy markers ²
20,620	L	76	68	-8	-10.1	27-3010 Announcers
25,340	L	155	137	-18	-11.8	41-9091 Door-to-door sales workers, news and street vendors, and related workers

See footnotes at end of table.

Table I-1. Educational attainment cluster, most significant source of postsecondary education or training, and educational attainment distribution, by occupation¹—Continued

(Employment in thousands)

2002 national employment matrix occupation	Most significant source of postsecondary education or training ⁶	Educational attainment cluster ¹⁰	Percent of workers aged 25 to 44, by educational attainment		
			High school or less	Some college	College or higher
41-3041 Travel agents	Postsecondary vocational award	HS/SC/C	27.9	44.1	28.0
25-2011 Preschool teachers, except special education	Postsecondary vocational award	HS/SC/C	21.7	31.0	47.2
41-2021 Counter and rental clerks	Short-term on-the-job training	HS/SC/C	49.1	28.1	22.8
39-9099 Personal care and service workers, all other	Short-term on-the-job training	HS/SC/C	40.1	38.9	21.0
43-4121 Library assistants, clerical	Short-term on-the-job training	HS/SC/C	25.2	44.7	30.0
39-9032 Recreation workers	Bachelor's degree	HS/SC/C	22.0	30.6	47.4
39-6032 Transportation attendants, except flight attendants and baggage porters	Short-term on-the-job training	HS/SC/C	25.3	37.9	36.7
39-4021 Funeral attendants ⁶	Short-term on-the-job training	HS/SC/C	37.1	42.3	20.6
41-2031 Retail salespersons	Short-term on-the-job training	HS/SC/C	42.0	32.9	25.1
39-6021 Tour guides and escorts	Moderate-term on-the-job training	HS/SC/C	41.7	23.7	34.7
51-9132 Photographic processing machine operators	Short-term on-the-job training	HS/SC/C	41.6	32.8	25.5
15-1081 Network systems and data communications analysts	Bachelor's degree	SC/C	11.3	31.2	57.5
29-1071 Physician assistants	Bachelor's degree	SC/C	5.1	27.5	67.4
15-1061 Database administrators	Bachelor's degree	SC/C	9.8	23.0	67.1
29-2021 Dental hygienists	Associate degree	SC/C	5.3	62.6	32.1
15-1051 Computer systems analysts	Bachelor's degree	SC/C	10.4	27.2	62.4
15-1071 Network and computer systems administrators	Bachelor's degree	SC/C	11.1	38.8	50.2
15-1099 All other computer specialists	Associate degree	SC/C	10.4	27.2	62.4
11-3021 Computer and information systems managers	Bachelor's plus experience ⁹	SC/C	7.3	22.4	70.4
29-1124 Radiation therapists ³	Associate degree	SC/C	1.8	57.3	41.0
11-2022 Sales managers	Bachelor's plus experience ⁹	SC/C	9.7	23.2	67.2
15-1011 Computer and information scientists, research	Doctoral degree	SC/C	10.4	27.2	62.4
11-9111 Medical and health services managers	Bachelor's plus experience ⁹	SC/C	9.4	29.6	61.0
13-1061 Emergency management specialists ⁴	Work experience in a related occupation	SC/C	19.9	30.8	49.3
13-1072 Compensation, benefits, and job analysis specialists	Bachelor's degree	SC/C	15.8	28.5	55.7
13-1073 Training and development specialists	Bachelor's degree	SC/C	15.8	28.5	55.7
13-1198 All other business operations specialists	Bachelor's degree	SC/C	15.8	28.5	55.7
29-1111 Registered nurses	Associate degree	SC/C	1.8	40.1	58.1
27-3042 Technical writers	Bachelor's degree	SC/C	5.3	25.3	69.4
11-2011 Advertising and promotions managers	Bachelor's plus experience ⁹	SC/C	8.5	21.7	69.9
33-3051 Police and sheriff's patrol officers	Long-term on-the-job training	SC/C	18.8	53.4	27.8
29-2032 Diagnostic medical sonographers	Associate degree	SC/C	10.6	65.8	23.6
29-2033 Nuclear medicine technologists ²	Associate degree	SC/C	12.1	66.6	21.3
33-3021 Detectives and criminal investigators	Work experience in a related occupation	SC/C	9.4	35.0	55.6
11-2021 Marketing managers	Bachelor's plus experience ⁹	SC/C	9.7	23.2	67.2
11-3040 Human resources managers	Bachelor's plus experience ⁹	SC/C	13.4	25.8	60.8
29-2011 Medical and clinical laboratory technologists	Bachelor's degree	SC/C	14.8	35.5	49.7
27-2021 Athletes and sports competitors	Long-term on-the-job training	SC/C	14.8	25.5	59.7
13-2072 Loan officers	Bachelor's degree	SC/C	19.2	30.5	50.3
13-2041 Credit analysts	Bachelor's degree	SC/C	17.0	26.7	56.3
33-1021 First-line supervisors/managers of fire fighting and prevention workers	Work experience in a related occupation	SC/C	17.8	57.2	25.0
11-3031 Financial managers	Bachelor's plus experience ⁹	SC/C	14.4	24.3	61.3
27-2012 Producers and directors	Bachelor's plus experience ⁹	SC/C	4.8	21.9	73.3
11-1011 Chief executives	Bachelor's plus experience ⁹	SC/C	16.1	21.1	62.8
27-1014 Multi-media artists and animators	Bachelor's degree	SC/C	13.7	27.8	58.5
33-1012 First-line supervisors/managers of police and detectives	Work experience in a related occupation	SC/C	17.2	54.3	28.4
27-1021 Commercial and industrial designers	Bachelor's degree	SC/C	17.3	29.7	53.1
15-1021 Computer programmers	Bachelor's degree	SC/C	7.6	22.4	70.1
41-3031 Securities, commodities, and financial services sales agents	Bachelor's degree	SC/C	11.9	21.0	67.1
53-2021 Air traffic controllers	Long-term on-the-job training	SC/C	17.3	33.6	49.1
15-2090 Miscellaneous mathematical science occupations ⁷	Master's degree	SC/C	7.5	24.2	68.3
27-1011 Art directors	Bachelor's plus experience ⁹	SC/C	13.7	27.8	58.5
17-3099 All other drafters, engineering, and mapping technicians	Associate degree	SC/C	15.5	61.0	23.5
17-2112 Industrial engineers	Bachelor's degree	SC/C	5.1	26.5	68.3
27-1022 Fashion designers	Bachelor's degree	SC/C	17.3	29.7	53.1

See footnotes at end of table.

Table I-1. Educational attainment cluster, most significant source of postsecondary education or training, and educational attainment distribution, by occupation¹—Continued

(Employment in thousands)

2002 median annual earnings		Employment		Employment change, 2002–12		2002 national employment matrix occupation	
Dollars	Rank ¹¹	2002	2012	Numeric	Percent		
\$26,630	L	118	102	-16	-13.8	41-3041	Travel agents
19,270	VL	424	577	153	36.2	25-2011	Preschool teachers, except special education
17,280	VL	436	550	114	26.2	41-2021	Counter and rental clerks
17,820	VL	134	168	35	25.9	39-9099	Personal care and service workers, all other
19,450	VL	120	146	26	21.5	43-4121	Library assistants, clerical
18,060	VL	302	364	62	20.5	39-9032	Recreation workers
						39-6032	Transportation attendants, except flight attendants and baggage porters
18,720	VL	26	31	5	18.9		
18,190	VL	26	31	5	18.9	39-4021	Funeral attendants ⁶
17,710	VL	4,076	4,672	596	14.6	41-2031	Retail salespersons
18,500	VL	36	40	4	11.0	39-6021	Tour guides and escorts
18,820	VL	54	59	5	9.2	51-9132	Photographic processing machine operators
58,420	VH	186	292	106	57.0	15-1081	Network systems and data communications analysts
64,670	VH	63	94	31	48.8	29-1071	Physician assistants
55,480	VH	110	159	49	44.2	15-1061	Database administrators
55,320	VH	148	212	64	43.1	29-2021	Dental hygienists
62,890	VH	468	653	184	39.4	15-1051	Computer systems analysts
54,810	VH	251	345	94	37.4	15-1071	Network and computer systems administrators
54,070	VH	192	262	70	36.5	15-1099	All other computer specialists
85,240	VH	284	387	103	36.1	11-3021	Computer and information systems managers
50,640	VH	14	18	4	31.6	29-1124	Radiation therapists ³
75,040	VH	343	448	105	30.5	11-2022	Sales managers
77,760	VH	23	30	7	30.0	15-1011	Computer and information scientists, research
61,370	VH	244	315	71	29.3	11-9111	Medical and health services managers
43,560	VH	11	14	3	28.2	13-1061	Emergency management specialists ⁴
45,100	VH	91	116	25	28.0	13-1072	Compensation, benefits, and job analysis specialists
42,800	VH	209	267	58	27.9	13-1073	Training and development specialists
50,680	VH	1,056	1,346	290	27.5	13-1198	All other business operations specialists
48,090	VH	2,284	2,908	623	27.3	29-1111	Registered nurses
50,580	VH	50	63	13	27.1	27-3042	Technical writers
57,130	VH	85	107	21	25.0	11-2011	Advertising and promotions managers
42,270	VH	619	772	153	24.7	33-3051	Police and sheriff's patrol officers
48,660	VH	37	45	9	24.0	29-2032	Diagnostic medical sonographers
48,750	VH	17	21	4	23.6	29-2033	Nuclear medicine technologists ²
51,410	VH	94	115	21	22.4	33-3021	Detectives and criminal investigators
78,250	VH	203	246	43	21.4	11-2021	Marketing managers
64,710	VH	202	242	39	19.4	11-3040	Human resources managers
42,910	VH	150	179	29	19.3	29-2011	Medical and clinical laboratory technologists
45,320	VH	15	18	3	19.2	27-2021	Athletes and sports competitors
43,980	VH	223	266	42	18.8	13-2072	Loan officers
42,910	VH	66	78	12	18.7	13-2041	Credit analysts
55,450	VH	63	74	12	18.7	33-1021	First-line supervisors/managers of fire fighting and prevention workers
73,340	VH	599	709	109	18.3	11-3031	Financial managers
46,240	VH	76	90	14	18.2	27-2012	Producers and directors
126,260	VH	553	645	93	16.8	11-1011	Chief executives
43,980	VH	75	87	12	15.8	27-1014	Multi-media artists and animators
61,010	VH	114	131	17	15.2	33-1012	First-line supervisors/managers of police and detectives
52,260	VH	52	59	8	14.6	27-1021	Commercial and industrial designers
60,290	VH	499	571	73	14.6	15-1021	Computer programmers
60,990	VH	300	339	39	13.0	41-3031	Securities, commodities, and financial services sales agents
91,600	VH	26	29	3	12.6	53-2021	Air traffic controllers
52,060	VH	7	8	1	11.8	15-2090	Miscellaneous mathematical science occupations ⁷
61,850	VH	51	56	6	11.4	27-1011	Art directors
44,450	VH	150	167	17	11.3	17-3099	All other drafters, engineering, and mapping technicians
62,150	VH	158	175	17	10.6	17-2112	Industrial engineers
51,290	VH	15	16	2	10.6	27-1022	Fashion designers

See footnotes at end of table.

Table I-1. Educational attainment cluster, most significant source of postsecondary education or training, and educational attainment distribution, by occupation¹—Continued

(Employment in thousands)

2002 national employment matrix occupation		Most significant source of postsecondary education or training ⁵	Educational attainment cluster ¹⁰	Percent of workers aged 25 to 44, by educational attainment		
				High school or less	Some college	College or higher
13-1041	Compliance officers, except agriculture, construction, health and safety, and transportation	Long-term on-the-job training	SC/C	11.9	30.8	57.3
13-2061	Financial examiners ⁷	Bachelor's degree	SC/C	11.3	23.4	65.3
17-2111	Health and safety engineers, except mining safety engineers and inspectors	Bachelor's degree	SC/C	5.1	26.5	68.3
11-9061	Funeral directors	Associate degree	SC/C	4.5	56.2	39.2
15-2031	Operations research analysts	Master's degree	SC/C	11.0	30.7	58.3
17-2061	Computer hardware engineers	Bachelor's degree	SC/C	5.9	25.5	68.6
13-2081	Tax examiners, collectors, and revenue agents	Bachelor's degree	SC/C	14.6	32.1	53.3
11-3061	Purchasing managers	Bachelor's plus experience ⁹	SC/C	15.0	31.0	54.0
19-1032	Foresters ²	Bachelor's degree	SC/C	9.7	23.2	67.1
19-1031	Conservation scientists ²	Bachelor's degree	SC/C	9.7	23.2	67.1
15-2021	Mathematicians ⁷	Master's degree	SC/C	7.5	24.2	68.3
31-2021	Physical therapist assistants	Associate degree	SC/C	16.0	61.5	22.5
25-3021	Self-enrichment education teachers	Work experience in a related occupation	SC/C	14.4	30.4	55.2
29-1126	Respiratory therapists	Associate degree	SC/C	4.8	67.6	27.6
25-3999	All other teachers, primary, secondary, and adult	Bachelor's degree	SC/C	14.4	30.4	55.2
29-2031	Cardiovascular technologists and technicians	Associate degree	SC/C	10.6	65.8	23.6
15-1041	Computer support specialists	Associate degree	SC/C	15.5	42.7	41.8
23-2011	Paralegals and legal assistants	Associate degree	SC/C	15.8	41.9	42.2
13-1071	Employment, recruitment, and placement specialists	Bachelor's degree	SC/C	15.8	28.5	55.7
31-9011	Massage therapists	Postsecondary vocational award	SC/C	17.7	47.0	35.3
27-4032	Film and video editors ³	Bachelor's degree	SC/C	15.0	34.9	50.1
33-9021	Private detectives and investigators	Work experience in a related occupation	SC/C	18.4	35.9	45.8
21-2021	Directors, religious activities and education	Bachelor's degree	SC/C	11.1	31.9	57.0
29-2034	Radiologic technologists and technicians	Associate degree	SC/C	10.6	65.8	23.6
27-3091	Interpreters and translators ²	Long-term on-the-job training	SC/C	16.4	30.9	52.8
27-1024	Graphic designers	Bachelor's degree	SC/C	17.3	29.7	53.1
21-1091	Health educators ²	Master's degree	SC/C	18.4	23.7	57.9
27-1025	Interior designers	Bachelor's degree	SC/C	17.3	29.7	53.1
13-1121	Meeting and convention planners	Bachelor's degree	SC/C	15.4	26.7	57.9
27-1027	Set and exhibit designers ²	Bachelor's degree	SC/C	19.8	31.8	48.4
25-3011	Adult literacy, remedial education, and GED teachers and instructors	Bachelor's degree	SC/C	14.4	30.4	55.2
27-4099	All other media and communication equipment workers ⁷	Moderate-term on-the-job training	SC/C	19.0	31.9	49.1
29-2012	Medical and clinical laboratory technicians	Associate degree	SC/C	14.8	35.5	49.7
27-2022	Coaches and scouts	Long-term on-the-job training	SC/C	14.8	25.5	59.7
13-2071	Loan counselors	Bachelor's degree	SC/C	19.2	30.5	50.3
13-2021	Appraisers and assessors of real estate	Postsecondary vocational award	SC/C	14.7	29.9	55.4
53-2022	Airfield operations specialists ⁴	Long-term on-the-job training	SC/C	17.3	33.6	49.1
27-3099	All other media and communication workers	Long-term on-the-job training	SC/C	13.8	32.5	53.7
27-1013	Fine artists, including painters, sculptors, and illustrators	Long-term on-the-job training	SC/C	13.7	27.8	58.5
21-1092	Probation officers and correctional treatment specialists	Bachelor's degree	SC/C	15.2	24.0	60.8
27-4031	Camera operators, television, video, and motion picture ²	Moderate-term on-the-job training	SC/C	14.5	28.2	57.3
27-1099	All other art and design workers	Bachelor's degree	SC/C	13.7	27.8	58.5
29-1125	Recreational therapists	Bachelor's degree	SC/C	12.5	22.3	65.2
17-3011	Architectural and civil drafters	Postsecondary vocational award	SC/C	15.5	61.0	23.5
17-3013	Mechanical drafters	Postsecondary vocational award	SC/C	15.5	61.0	23.5
17-3012	Electrical and electronics drafters	Postsecondary vocational award	SC/C	15.5	61.0	23.5
21-1093	Social and human service assistants	Moderate-term on-the-job training	SC/C	15.2	24.0	60.8
31-2022	Physical therapist aides	Short-term on-the-job training	SC/C	16.0	61.5	22.5
13-2082	Tax preparers	Moderate-term on-the-job training	SC/C	16.7	29.2	54.0
27-2011	Actors	Long-term on-the-job training	SC/C	4.0	29.6	66.4
27-2023	Umpires, referees, and other sports officials ²	Long-term on-the-job training	SC/C	16.3	22.9	60.8
27-4021	Photographers	Long-term on-the-job training	SC/C	19.4	27.4	53.1
27-1026	Merchandise displayers and window trimmers	Moderate-term on-the-job training	SC/C	17.3	29.7	53.1
27-1023	Floral designers	Moderate-term on-the-job training	SC/C	17.3	29.7	53.1

See footnotes at end of table.

Table I-1. Educational attainment cluster, most significant source of postsecondary education or training, and educational attainment distribution, by occupation¹—Continued

(Employment in thousands)

2002 median annual earnings		Employment		Employment change, 2002–12		2002 national employment matrix occupation
Dollars	Rank ¹¹	2002	2012	Numeric	Percent	
\$44,800	VH	158	173	15	9.8	13-1041 Compliance officers, except agriculture, construction, health and safety, and transportation
56,220	VH	25	27	2	8.9	13-2061 Financial examiners ⁷
58,010	VH	36	38	3	7.9	17-2111 Health and safety engineers, except mining safety engineers and inspectors
43,380	VH	24	26	2	6.6	11-9061 Funeral directors
56,920	VH	62	66	4	6.2	15-2031 Operations research analysts
72,150	VH	74	78	5	6.1	17-2061 Computer hardware engineers
42,250	VH	75	79	4	5.0	13-2081 Tax examiners, collectors, and revenue agents
59,890	VH	108	113	5	4.8	11-3061 Purchasing managers
46,730	VH	14	14	1	4.7	19-1032 Foresters ²
50,340	VH	19	20	1	4.1	19-1031 Conservation scientists ²
76,470	VH	3	3	0	-1.0	15-2021 Mathematicians ⁷
36,080	H	50	73	22	44.6	31-2021 Physical therapist assistants
29,320	H	200	281	80	40.1	25-3021 Self-enrichment education teachers
40,220	H	86	116	30	34.8	29-1126 Respiratory therapists
29,250	H	679	908	229	33.7	25-3999 All other teachers, primary, secondary, and adult
36,430	H	43	58	15	33.5	29-2031 Cardiovascular technologists and technicians
39,100	H	507	660	153	30.3	15-1041 Computer support specialists
37,950	H	200	257	57	28.7	23-2011 Paralegals and legal assistants
39,410	H	175	223	48	27.3	13-1071 Employment, recruitment, and placement specialists
28,610	H	92	117	25	27.0	31-9011 Massage therapists
38,270	H	19	25	5	26.4	27-4032 Film and video editors ³
29,300	H	48	60	12	25.3	33-9021 Private detectives and investigators
28,020	H	105	131	25	24.1	21-2021 Directors, religious activities and education
38,970	H	174	214	40	23.0	29-2034 Radiologic technologists and technicians
32,590	H	24	29	5	22.0	27-3091 Interpreters and translators ²
36,680	H	212	258	46	21.9	27-1024 Graphic designers
36,240	H	45	54	10	21.9	21-1091 Health educators ²
39,180	H	60	73	13	21.7	27-1025 Interior designers
37,420	H	37	45	8	21.3	13-1121 Meeting and convention planners
33,870	H	12	15	3	20.9	27-1027 Set and exhibit designers ²
36,400	H	80	96	16	20.4	25-3011 Adult literacy, remedial education, and GED teachers and instructors
34,680	H	24	29	5	20.1	27-4099 All other media and communication equipment workers ⁷
29,040	H	147	176	29	19.4	29-2012 Medical and clinical laboratory technicians
27,880	H	130	153	24	18.3	27-2022 Coaches and scouts
32,010	H	31	37	6	17.8	13-2071 Loan counselors
41,760	H	88	104	16	17.6	13-2021 Appraisers and assessors of real estate
36,010	H	6	7	1	17.2	53-2022 Airfield operations specialists ⁴
38,680	H	58	68	10	17.2	27-3099 All other media and communication workers
35,260	H	23	27	4	16.5	27-1013 Fine artists, including painters, sculptors, and illustrators
38,360	H	84	97	12	14.6	21-1092 Probation officers and correctional treatment specialists
32,720	H	28	32	4	13.4	27-4031 Camera operators, television, video, and motion picture ²
34,060	H	95	106	11	11.5	27-1099 All other art and design workers
30,540	H	27	29	2	9.1	29-1125 Recreational therapists
37,330	H	106	110	4	4.2	17-3011 Architectural and civil drafters
40,730	H	72	74	1	1.9	17-3013 Mechanical drafters
41,090	H	38	38	0	.7	17-3012 Electrical and electronics drafters
23,370	L	305	454	149	48.7	21-1093 Social and human service assistants
20,670	L	37	54	17	46.4	31-2022 Physical therapist aides
25,630	L	79	98	18	23.2	13-2082 Tax preparers
23,470	L	63	74	11	17.7	27-2011 Actors
20,540	L	14	16	2	16.9	27-2023 Umpires, referees, and other sports officials ²
24,040	L	130	148	18	13.6	27-4021 Photographers
22,550	L	77	86	9	11.3	27-1026 Merchandise displayers and window trimmers
19,480	VL	104	117	13	12.4	27-1023 Floral designers

See footnotes at end of table.

Table I-1. Educational attainment cluster, most significant source of postsecondary education or training, and educational attainment distribution, by occupation¹—Continued

(Employment in thousands)

2002 national employment matrix occupation	Most significant source of postsecondary education or training ⁵	Educational attainment cluster ¹⁰	Percent of workers aged 25 to 44, by educational attainment		
			High school or less	Some college	College or higher
15-1031 Computer software engineers, applications	Bachelor's degree	C	4.1	15.2	80.7
15-1032 Computer software engineers, systems software	Bachelor's degree	C	4.1	15.2	80.7
17-2081 Environmental engineers	Bachelor's degree	C	7.3	6.9	85.9
25-1000 Postsecondary teachers	Doctoral degree	C	2.8	7.4	89.8
29-1123 Physical therapists	Master's degree	C	2.7	5.8	91.4
29-1122 Occupational therapists	Bachelor's degree	C	.1	13.8	86.1
13-2052 Personal financial advisors	Bachelor's degree	C	4.5	13.7	81.8
19-1041 Epidemiologists ⁴	Master's degree	C	.6	1.8	97.7
13-1111 Management analysts	Bachelor's plus experience ⁹	C	7.5	15.7	76.8
29-1051 Pharmacists	First professional degree	C	1.3	3.8	94.8
25-2040 Special education teachers	Bachelor's degree	C	3.8	5.9	90.2
29-1121 Audiologists ²	Master's degree	C	2.5	.3	97.1
13-1011 Agents and business managers of artists, performers, and athletes	Bachelor's plus experience ⁹	C	17.4	17.0	65.6
11-9151 Social and community service managers	Bachelor's degree	C	9.7	19.2	71.1
29-1127 Speech-language pathologists	Master's degree	C	1.7	1.4	97.0
19-1042 Medical scientists, except epidemiologists	Doctoral degree	C	.6	1.8	97.7
17-2031 Biomedical engineers ⁷	Bachelor's degree	C	5.9	19.2	74.9
11-9033 Education administrators, postsecondary	Bachelor's plus experience ⁹	C	8.6	17.9	73.5
25-9031 Instructional coordinators	Master's degree	C	8.2	7.1	84.6
29-1131 Veterinarians	First professional degree	C	.0	1.2	98.8
29-1198 All other health diagnosing and treating practitioners	Bachelor's degree	C	7.3	9.4	83.3
19-3031 Clinical, counseling, and school psychologists	Doctoral degree	C	.0	.6	99.4
19-2041 Environmental scientists and specialists, including health	Master's degree	C	3.3	4.4	92.3
11-2031 Public relations managers	Bachelor's plus experience ⁹	C	9.7	19.8	70.6
19-3021 Market research analysts	Master's degree	C	7.4	13.6	79.0
29-1011 Chiropractors	First professional degree	C	2.0	.2	97.9
19-1021 Biochemists and biophysicists	Doctoral degree	C	.5	3.6	95.9
19-1029 Biological scientists, all other	Bachelor's degree	C	.5	3.6	95.9
17-1012 Landscape architects	Bachelor's degree	C	3.0	9.8	87.2
19-2043 Hydrologists ⁴	Master's degree	C	3.3	4.4	92.3
11-9032 Education administrators, elementary and secondary school	Bachelor's plus experience ⁹	C	8.6	17.9	73.5
19-1022 Microbiologists	Doctoral degree	C	.5	3.6	95.9
41-9031 Sales engineers	Bachelor's degree	C	4.2	15.9	79.9
19-3092 Geographers ⁴	Master's degree	C	6.5	11.5	81.9
13-2011 Accountants and auditors	Bachelor's degree	C	6.7	19.7	73.6
29-1060 Physicians and surgeons	First professional degree	C	.8	2.3	96.9
11-9039 Education administrators, all other	Bachelor's plus experience ⁹	C	8.6	17.9	73.5
13-2051 Financial analysts	Bachelor's degree	C	5.9	15.9	78.2
53-2011 Airline pilots, copilots, and flight engineers	Bachelor's degree	C	5.0	18.9	76.1
19-1099 All other life scientists	Bachelor's degree	C	.6	1.8	97.7
25-2031 Secondary school teachers, except special and vocational education	Bachelor's degree	C	1.5	3.6	94.9
17-1011 Architects, except landscape and naval	Bachelor's degree	C	3.0	9.8	87.2
29-1041 Optometrists	First professional degree	C	8.4	8.0	83.6
23-1011 Lawyers	First professional degree	C	.7	1.5	97.8
19-2021 Atmospheric and space scientists ²	Bachelor's degree	C	.4	9.2	90.4
27-3043 Writers and authors	Bachelor's degree	C	3.0	13.1	83.8
19-3032 Industrial-organizational psychologists ⁴	Master's degree	C	.0	.6	99.4
25-2021 Elementary school teachers, except special education	Bachelor's degree	C	2.8	5.3	91.8
17-1021 Cartographers and photogrammetrists ⁴	Bachelor's degree	C	11.3	14.1	74.6
29-1081 Podiatrists ²	First professional degree	C	.6	.7	98.7
21-1012 Educational, vocational, and school counselors	Master's degree	C	10.6	19.6	69.8
53-2012 Commercial pilots	Postsecondary vocational award	C	5.0	18.9	76.1
15-2011 Actuaries	Bachelor's plus experience ⁹	C	2.7	9.0	88.4
13-2031 Budget analysts	Bachelor's degree	C	7.3	17.6	75.1
23-1022 Arbitrators, mediators, and conciliators	Bachelor's plus experience ⁹	C	.7	1.5	97.8

See footnotes at end of table.

Table I-1. Educational attainment cluster, most significant source of postsecondary education or training, and educational attainment distribution, by occupation¹—Continued

(Employment in thousands)

2002 median annual earnings		Employment		Employment change, 2002–12		2002 national employment matrix occupation
Dollars	Rank ¹¹	2002	2012	Numeric	Percent	
\$70,900	VH	394	573	179	45.5	15-1031 Computer software engineers, applications
74,040	VH	281	409	128	45.5	15-1032 Computer software engineers, systems software
61,410	VH	47	65	18	38.2	17-2081 Environmental engineers
49,090	VH	1,581	2,184	603	38.1	25-1000 Postsecondary teachers
57,330	VH	137	185	48	35.3	29-1123 Physical therapists
51,990	VH	82	110	29	35.2	29-1122 Occupational therapists
56,680	VH	126	170	44	34.6	13-2052 Personal financial advisors
53,840	VH	4	5	1	32.5	19-1041 Epidemiologists ⁴
60,340	VH	577	753	176	30.4	13-1111 Management analysts
77,050	VH	230	299	69	30.1	29-1051 Pharmacists
43,450	VH	433	563	130	30.0	25-2040 Special education teachers
48,400	VH	11	14	3	29.0	29-1121 Audiologists ²
55,730	VH	15	19	4	27.8	13-1011 Agents and business managers of artists, performers, and athletes
43,080	VH	129	164	36	27.7	11-9151 Social and community service managers
49,450	VH	94	120	26	27.2	29-1127 Speech-language pathologists
56,980	VH	58	73	16	26.9	19-1042 Medical scientists, except epidemiologists
60,410	VH	8	10	2	26.1	17-2031 Biomedical engineers ⁷
64,640	VH	125	157	32	25.9	11-9033 Education administrators, postsecondary
47,350	VH	98	123	25	25.4	25-9031 Instructional coordinators
63,090	VH	58	72	14	25.1	29-1131 Veterinarians
52,430	VH	107	134	26	24.5	29-1198 All other health diagnosing and treating practitioners
51,170	VH	137	171	34	24.4	19-3031 Clinical, counseling, and school psychologists
47,600	VH	65	80	15	23.7	19-2041 Environmental scientists and specialists, including health
60,640	VH	69	85	16	23.4	11-2031 Public relations managers
53,810	VH	134	166	31	23.4	19-3021 Market research analysts
65,330	VH	49	60	11	23.3	29-1011 Chiropractors
60,390	VH	17	21	4	22.9	19-1021 Biochemists and biophysicists
53,300	VH	27	33	6	22.3	19-1029 Biological scientists, all other
47,400	VH	23	28	5	22.2	17-1012 Landscape architects
56,530	VH	8	10	2	21.0	19-2043 Hydrologists ⁴
71,490	VH	217	262	45	20.7	11-9032 Education administrators, elementary and secondary school
51,020	VH	16	20	3	20.0	19-1022 Microbiologists
63,660	VH	82	98	16	19.9	41-9031 Sales engineers
53,420	VH	1	1	0	19.5	19-3092 Geographers ⁴
47,000	VH	1,055	1,261	205	19.5	13-2011 Accountants and auditors
145,600	VH	583	697	114	19.5	29-1060 Physicians and surgeons
57,840	VH	27	32	5	19.1	11-9039 Education administrators, all other
57,100	VH	172	204	32	18.7	13-2051 Financial analysts
109,580	VH	79	94	15	18.5	53-2011 Airline pilots, copilots, and flight engineers
46,140	VH	26	31	5	18.3	19-1099 All other life scientists
43,950	VH	988	1,167	180	18.2	25-2031 Secondary school teachers, except special and vocational education
56,620	VH	113	133	20	17.2	17-1011 Architects, except landscape and naval
86,090	VH	32	38	5	17.1	29-1041 Optometrists
90,290	VH	695	813	118	17.0	23-1011 Lawyers
60,200	VH	8	9	1	16.2	19-2021 Atmospheric and space scientists ²
42,790	VH	139	161	22	16.1	27-3043 Writers and authors
63,710	VH	2	2	0	16.0	19-3032 Industrial-organizational psychologists ⁴
41,780	VH	1,467	1,690	223	15.2	25-2021 Elementary school teachers, except special education
42,870	VH	9	10	1	15.1	17-1021 Cartographers and photogrammetrists ⁴
94,870	VH	13	15	2	15.0	29-1081 Podiatrists ²
44,100	VH	228	262	34	15.0	21-1012 Educational, vocational, and school counselors
47,970	VH	21	24	3	14.9	53-2012 Commercial pilots
69,970	VH	15	18	2	14.9	15-2011 Actuaries
52,480	VH	62	71	9	14.0	13-2031 Budget analysts
47,320	VH	6	7	1	13.7	23-1022 Arbitrators, mediators, and conciliators

See footnotes at end of table.

Table I-1. Educational attainment cluster, most significant source of postsecondary education or training, and educational attainment distribution, by occupation¹—Continued

(Employment in thousands)

2002 national employment matrix occupation	Most significant source of postsecondary education or training ⁶	Educational attainment cluster ¹⁰	Percent of workers aged 25 to 44, by educational attainment		
			High school or less	Some college	College or higher
19-3011 Economists ²	Master's degree	C	1.0	8.5	90.4
19-3041 Sociologists ⁷	Master's degree	C	3.5	7.1	89.5
29-9010 Occupational health and safety specialists and technicians ⁴	Bachelor's degree	C	9.2	17.5	73.3
19-2031 Chemists	Bachelor's degree	C	2.9	3.2	94.0
19-2042 Geoscientists, except hydrologists and geographers	Master's degree	C	3.3	4.4	92.3
11-9121 Natural sciences managers ²	Bachelor's plus experience ⁹	C	8.8	4.2	87.0
17-1099 All other architects, surveyors, and cartographers	Bachelor's degree	C	11.3	14.1	74.6
19-3051 Urban and regional planners	Master's degree	C	4.5	.0	95.5
17-2021 Agricultural engineers ⁷	Bachelor's degree	C	5.9	19.2	74.9
25-4021 Librarians	Master's degree	C	8.5	15.0	76.5
19-3098 All other social scientists and related workers	Master's degree	C	.0	.6	99.4
17-2199 All other engineers	Bachelor's degree	C	3.9	19.1	77.0
17-2072 Electronics engineers, except computer	Bachelor's degree	C	4.9	14.7	80.4
11-9041 Engineering managers	Bachelor's plus experience ⁹	C	7.6	16.9	75.5
25-2032 Vocational education teachers, secondary school	Bachelor's plus experience ⁹	C	1.5	3.6	94.9
25-2023 Vocational education teachers, middle school	Bachelor's plus experience ⁹	C	2.8	5.3	91.8
25-2022 Middle school teachers, except special and vocational education	Bachelor's degree	C	2.8	5.3	91.8
23-1023 Judges, magistrate judges, and magistrates	Bachelor's plus experience ⁹	C	.7	1.5	97.8
19-2032 Materials scientists ²	Bachelor's degree	C	3.2	5.6	91.2
17-2051 Civil engineers	Bachelor's degree	C	2.7	9.2	88.1
19-1023 Zoologists and wildlife biologists	Bachelor's degree	C	.5	3.6	95.9
19-2012 Physicists	Doctoral degree	C	.0	6.5	93.5
19-3093 Historians ⁴	Master's degree	C	6.5	11.5	81.9
19-2099 All other physical scientists	Bachelor's degree	C	.7	1.3	98.0
19-3094 Political scientists ⁴	Master's degree	C	6.5	11.5	81.9
23-1021 Administrative law judges, adjudicators, and hearing officers	Bachelor's plus experience ⁹	C	.7	1.5	97.8
19-2011 Astronomers ⁴	Doctoral degree	C	.0	6.5	93.5
17-2141 Mechanical engineers	Bachelor's degree	C	5.0	17.7	77.3
15-2041 Statisticians	Master's degree	C	6.7	10.4	82.9
29-1020 Dentists	First professional degree	C	1.0	3.5	95.5
17-2131 Materials engineers	Bachelor's degree	C	10.4	20.0	69.6
17-2071 Electrical engineers	Bachelor's degree	C	4.9	14.7	80.4
17-2041 Chemical engineers	Bachelor's degree	C	1.7	5.4	92.9
17-2161 Nuclear engineers ²	Bachelor's degree	C	5.4	5.5	89.1
17-2151 Mining and geological engineers, including mining safety engineers ⁷	Bachelor's degree	C	5.9	19.2	74.9
17-2121 Marine engineers and naval architects ⁷	Bachelor's degree	C	5.9	19.2	74.9
17-2011 Aerospace engineers	Bachelor's degree	C	4.5	13.8	81.8
17-2171 Petroleum engineers	Bachelor's degree	C	7.5	9.6	82.9
21-1023 Mental health and substance abuse social workers	Master's degree	C	7.8	18.4	73.8
27-3031 Public relations specialists	Bachelor's degree	C	7.8	14.3	77.8
11-9031 Education administrators, preschool and child care center/program	Bachelor's plus experience ⁹	C	8.6	17.9	73.5
29-9091 Athletic trainers ⁴	Bachelor's degree	C	9.2	17.5	73.3
21-1022 Medical and public health social workers	Bachelor's degree	C	7.8	18.4	73.8
21-9099 All other counselors, social, and religious workers	Bachelor's degree	C	10.6	19.6	69.8
21-1014 Mental health counselors	Master's degree	C	10.6	19.6	69.8
21-1011 Substance abuse and behavioral disorder counselors ..	Master's degree	C	10.6	19.6	69.8
21-1021 Child, family, and school social workers	Bachelor's degree	C	7.8	18.4	73.8
21-1013 Marriage and family therapists ²	Master's degree	C	9.0	16.3	74.6
25-4010 Archivists, curators, and museum technicians	Master's degree	C	3.5	8.9	87.6
25-9011 Audio-visual collections specialists ⁴	Moderate-term on-the-job training	C	8.2	7.1	84.6
21-2011 Clergy	First professional degree	C	8.2	13.9	77.8
19-3091 Anthropologists and archeologists ⁴	Master's degree	C	6.5	11.5	81.9
27-3041 Editors	Bachelor's degree	C	5.6	13.1	81.3
25-9021 Farm and home management advisors ⁴	Bachelor's degree	C	8.2	7.1	84.6
27-3020 News analysts, reporters and correspondents	Bachelor's plus experience ⁹	C	6.6	6.5	86.9

See footnotes at end of table.

Table I-1. Educational attainment cluster, most significant source of postsecondary education or training, and educational attainment distribution, by occupation¹—Continued

(Employment in thousands)

2002 median annual earnings		Employment		Employment change, 2002–12		2002 national employment matrix occupation
Dollars	Rank ¹¹	2002	2012	Numeric	Percent	
\$68,550	VH	16	18	2	13.4	19-3011 Economists ²
53,160	VH	3	3	0	13.4	19-3041 Sociologists ⁷
46,010	VH	41	47	5	13.2	29-9010 Occupational health and safety specialists and technicians ⁴
52,890	VH	84	95	11	12.7	19-2031 Chemists
67,470	VH	28	31	3	11.5	19-2042 Geoscientists, except hydrologists and geographers
82,250	VH	45	51	5	11.3	11-9121 Natural sciences managers ²
43,210	VH	3	4	0	10.9	17-1099 All other architects, surveyors, and cartographers
49,880	VH	32	36	3	10.7	19-3051 Urban and regional planners
50,700	VH	3	3	0	10.3	17-2021 Agricultural engineers ⁷
43,090	VH	167	184	17	10.1	25-4021 Librarians
53,940	VH	68	74	7	9.7	19-3098 All other social scientists and related workers
70,540	VH	243	267	24	9.7	17-2199 All other engineers
69,930	VH	136	149	13	9.4	17-2072 Electronics engineers, except computer
90,930	VH	212	231	20	9.2	11-9041 Engineering managers
44,340	VH	105	115	10	9.0	25-2032 Vocational education teachers, secondary school
42,590	VH	18	19	2	9.0	25-2023 Vocational education teachers, middle school
41,820	VH	585	637	52	9.0	25-2022 Middle school teachers, except special and vocational education
94,070	VH	27	29	2	8.7	23-1023 Judges, magistrate judges, and magistrates
64,590	VH	7	8	1	8.6	19-2032 Materials scientists ²
60,070	VH	228	246	18	8.0	17-2051 Civil engineers
47,740	VH	15	16	1	7.7	19-1023 Zoologists and wildlife biologists
85,020	VH	13	14	1	6.9	19-2012 Physicists
42,030	VH	2	2	0	6.6	19-3093 Historians ⁴
67,890	VH	37	39	2	6.5	19-2099 All other physical scientists
80,560	VH	6	6	0	5.9	19-3094 Political scientists ⁴
64,540	VH	19	20	1	5.8	23-1021 Administrative law judges, adjudicators, and hearing officers
81,690	VH	1	1	0	4.9	19-2011 Astronomers ⁴
62,880	VH	215	225	10	4.8	17-2141 Mechanical engineers
57,080	VH	20	21	1	4.8	15-2041 Statisticians
123,210	VH	153	159	6	4.1	29-1020 Dentists
62,590	VH	24	25	1	4.1	17-2131 Materials engineers
68,180	VH	156	160	4	2.5	17-2071 Electrical engineers
72,490	VH	33	33	0	.4	17-2041 Chemical engineers
81,350	VH	16	16	0	-.1	17-2161 Nuclear engineers ²
61,770	VH	5	5	0	-2.7	17-2151 Mining and geological engineers, including mining safety engineers ⁷
66,650	VH	5	5	0	-5.0	17-2121 Marine engineers and naval architects ⁷
72,750	VH	78	74	-4	-5.2	17-2011 Aerospace engineers
83,370	VH	14	12	-1	-9.8	17-2171 Petroleum engineers
32,850	H	95	128	33	34.5	21-1023 Mental health and substance abuse social workers
41,710	H	158	210	52	32.9	27-3031 Public relations specialists
33,340	H	58	77	19	32.0	11-9031 Education administrators, preschool and child care center/program
33,820	H	14	19	4	29.9	29-9091 Athletic trainers ⁴
37,380	H	107	138	31	28.6	21-1022 Medical and public health social workers
31,150	H	248	318	70	28.3	21-9099 All other counselors, social, and religious workers
29,940	H	85	107	23	26.6	21-1014 Mental health counselors
30,180	H	67	83	16	23.2	21-1011 Substance abuse and behavioral disorder counselors
33,150	H	274	338	64	23.2	21-1021 Child, family, and school social workers
35,580	H	23	29	5	22.4	21-1013 Marriage and family therapists ²
35,270	H	22	26	4	17.0	25-4010 Archivists, curators, and museum technicians
32,360	H	10	11	2	16.3	25-9011 Audio-visual collections specialists ⁴
33,110	H	400	463	62	15.5	21-2011 Clergy
38,620	H	5	5	1	12.8	19-3091 Anthropologists and archeologists ⁴
41,170	H	130	145	15	11.8	27-3041 Editors
39,430	H	16	17	1	6.9	25-9021 Farm and home management advisors ⁴
30,510	H	66	70	4	6.2	27-3020 News analysts, reporters and correspondents

See footnotes at end of table.

Table I-1. Educational attainment cluster, most significant source of postsecondary education or training, and educational attainment distribution, by occupation¹—Continued

(Employment in thousands)

2002 national employment matrix occupation	Most significant source of postsecondary education or training ⁸	Educational attainment cluster ¹⁰	Percent of workers aged 25 to 44, by educational attainment		
			High school or less	Some college	College or higher
17-1022 Surveyors	Bachelor's degree	C	11.3	14.1	74.6
21-1015 Rehabilitation counselors	Master's degree	C	10.6	19.6	69.8
19-3022 Survey researchers ²	Master's degree	C	7.5	14.8	77.6
25-9199 All other library, museum, training, and other education workers	Bachelor's degree	C	8.2	7.1	84.6
11-1031 Legislators	Bachelor's plus experience ⁹	C	.7	1.5	97.8

Table I-1. Educational attainment cluster, most significant source of postsecondary education or training, and educational attainment distribution, by occupation¹—Continued

(Employment in thousands)

2002 median annual earnings		Employment		Employment change, 2002–12		2002 national employment matrix occupation
Dollars	Rank ¹¹	2002	2012	Numeric	Percent	
\$39,970	H	56	58	2	4.2	17-1022 Surveyors
25,840	L	122	164	41	33.8	21-1015 Rehabilitation counselors
22,200	L	20	27	7	33.6	19-3022 Survey researchers ²
						25-9199 All other library, museum, training, and other education workers
27,280	L	93	116	23	24.6	
15,220	VL	67	68	1	1.1	11-1031 Legislators

¹ For a methodological note, see page 34.

² Employment of the 25-44 age group was less than 10,000; employment for the 25-and-older age group was used instead.

³ Employment of the 25-and-older age group was less than 10,000;

employment for the 16-and-older age group was used instead.

⁴ Employment was less than 10,000; employment for the 25-and-older age group was used instead.

⁵ CPS-based employment of the 25-44 age group was less than 10,000; employment for the 25-and-older age group was used instead.

⁶ CPS-based employment of the 25-and-older age group was less than 10,000; employment for the 16-and-older age group was used instead.

⁷ CPS-based employment was less than 10,000; CPS-based summary employment was used instead.

⁸ An occupation is placed into one of 11 categories that best describes

the education or training needed by most workers to become fully qualified in the occupation.

⁹ Bachelor's or higher degree, plus work experience.

¹⁰ The job types are presented in the following categories: HS = high school occupations, HS/SC = high school/some college occupations, SC = some college occupations, HS/SC/C = high school/some college/college occupations, SC/C = some college/college occupations, and C = college occupations.

¹¹ The quartile rankings of Occupational Employment Statistics Survey annual earnings data are presented in the following categories: VH = very high (\$41,820 or more), H = high (\$27,500 to \$41,780), L = low (\$19,710 to \$27,380), and VL = very low (up to \$19,600). The rankings were based on quartiles using one-fourth of total employment to define each quartile. Earnings are for wage and salary workers.

The educational attainment distribution of occupations: A note on methodology

To estimate the educational attainment distribution for each occupation, monthly data from the CPS are combined over the 2000–02 period. Combining 36 months of data results in more than 1 million individual data records of employed individuals aged 25 to 44 years that generated large enough sample sizes for most occupations to produce reliable estimates of the percentage of employees with a high school degree or less, with some college, and with a bachelor's degree or higher. The CPS provides employment information on 502 detailed occupations based on the 2000 Standard Occupational Classification (SOC) system. The CPS converted to the SOC in January 2003, but a research database with SOC-based occupational codes for the 2000–02 period was made available for this project. The sample weights for each month were divided by 36 so as to represent an average level of total employment for each occupation over the 3-year period from 2000–02.

Because the CPS uses SOC-based coding to generate estimates for 502 occupations, and because occupational projections are generated for a total of 725 occupations, the CPS-based occupations do not always have a one-to-one correspondence to the occupations used in BLS projections. The greater level of detail in the projections data results from the use of occupational information from the Occupational Employment Statistics (OES) survey, which provides detailed occupational employment information for 1.2 million establishments. However, the lack of educational attainment information in the OES makes the use of the CPS necessary for providing proxy estimates of educational attainment levels for each of the 725 projected occupations.

Research conducted for this project identified 370 OES-based occupations that have a one-to-one correspondence with CPS-based occupations used in the projections. Another 343 OES-based occupations are part of a larger aggregated CPS-based occupation. For example, the CPS occupation “marketing and sales managers” represents an aggregation of two OES-based occupations: “marketing managers” and “sales managers.” In this case, OES data from 2002 was used to determine the prorated employment share of marketing managers out of the total OES employment for marketing managers and sales managers combined. The

number of marketing managers with some college was determined by multiplying the total number of CPS-based marketing and sales managers by the computed share. The procedure for determining the employment levels by educational attainment for sales managers was applied in a similar fashion.

Another 12 OES-based occupations represent aggregations of two or more CPS-based occupations. (The maximum number of CPS occupations rolled up within an OES occupation was four.) For each of these OES-based occupations, the employment level by education was obtained by summing the educational attainment level of each the underlying CPS-based occupations.

A weighted employment of 10,000 was used as the minimum acceptable cutoff for estimating the percentages of employees falling into the three educational attainment categories. For 526 occupations, the weighted employment of 25-to 44-year-olds exceeded 10,000 and could be used to estimate the educational attainment distribution of these occupations. For the 199 occupations with employment below 10,000, a series of alternative data sets were used. The first alternative was to use data for the 25-years-and-older age group if employment in that group exceeded 10,000. If that test failed, the second alternative was to use data for the 16-years-and-older age group if employment in that group exceeded 10,000. These two tests resulted in estimates for 145 occupations. The third alternative was to use data for the larger, aggregated CPS-based (or CPS source) occupation if its employment exceeded 10,000 for the 25- to 44-year-old age group. Alternative four consisted of using the data if the CPS source occupation employment for the 25-years-and older age group in exceeded 10,000. The fifth alternative was to use the data if the CPS source occupation employment for the 16-years-and-older age group exceeded 10,000. If this latter group also had a weighted employment total less than 10,000, the educational distributions of occupations at the next higher level of aggregation in the Standard Occupational Classification system were used as proxies. In all, 54 occupations required the use of such proxies. The allocations underlying all of these estimates are available upon request.

such as so-called people skills that can result in substantial diversity in the educational attainment of those hired into the occupation.

How many jobs are projected to be filled by high school graduates (or those with less education), those with some college, and those with a bachelor's degree or higher?

Estimating the number of jobs that will be filled by those with different levels of educational attainment over the projection period is a difficult task that must be viewed with appropriate caution. The choice of methodology accompanying such estimates must be transparent to the user and allow analysts the freedom to test the sensitivity of the results to alternative specifications.

The method utilized here is to use the various education clusters to define the proportion of jobs *within* each cluster that require a high school diploma or less, some college, or a bachelor's degree or higher. For example, for college occupations (those with 60 percent or more of 25- to 44-year-olds having a bachelor's degree or higher), it is assumed that all jobs in the occupation require a college degree. The assignments of jobs for high school occupations and occupations requiring some college are similarly defined.

For a mixture occupation, such as one requiring some college or a college degree, it is assumed that *all* jobs in the cluster either require some college or a bachelor's degree or higher. To calculate the number of "some college" jobs in the occupation, one computes the ratio of the number of employees aged 25 to 44 years in that occupation who have some college to the number of employees aged 25 to 44 who have some college or a bachelor's degree or higher. The number of "some college" jobs in the occupation is the value of this ratio, multiplied by the employment level of the occupation. The employment level used depends on the period of interest. In the analysis that follows, the technique is applied to national employment matrix data for 2002, as well as projected data for the 2002–12 period. A similar procedure was adopted to identify the number of jobs requiring a bachelor's degree or higher. This procedure was then applied to the other mixture occupations.

How reasonable is this method for assigning occupational employment levels to the number of jobs requiring at most a high school diploma, some college, or a bachelor's degree or higher? One important standard of comparison is to compare the educational attainment distribution of jobs implied by these assignments with the actual distribution based on CPS data. The two distributions are not expected to be identical, but the differences that emerge provide a measure of the degree to which the actual heterogeneity of educational attainment within each occupation is not being captured by the method.

Table I-2 presents the results of a comparison between the actual educational attainment of individuals with the implied educational attainment distribution using the education clusters and the assignment method previously described. The comparison uses CPS data for 2000–02 and is restricted to occupations with a weighted employment

count of at least 10,000. As the table indicates, the educational attainment distribution based on this assignment method comes very close to the educational distribution of employment based on CPS data. Compared with the actual educational attainment distribution of employment, the percentage of individuals with a high school education or less calculated with the cluster-based method is slightly higher, while the percentage of those with a bachelor's degree or higher is slightly less.

Table I-2. Distribution of educational attainment in 2002 based on:

Education level	Actual CPS distribution of employment			Education clusters
	Ages 16 and older	Ages 25 and older	Ages 25-44	
High school graduate or less	43.2	40.8	40.4	46.3
Some college	28.6	27.7	28.4	27.8
Bachelor's degree or higher	28.2	31.5	31.1	25.8

What, then, does this assignment method imply about the projections of employment over the 2002–12 period? Table I-3 answers this question: using the education clusters to assign the projected change in employment for each of the 725 detailed occupations to the three educational attainment categories, the table shows that 39 percent of jobs are projected to be filled by those with a high school degree or less, 27 percent by those with some college, and 34 percent by those with a bachelor's degree or higher.

Table I-3. Distribution of educational attainment of projected employment change over the 2002–12 period, based on education clusters

Education level	Level	Percent
High school graduate or less	8,328	39.1
Some college	5,764	27.1
Bachelor's degree or higher	7,212	33.9
Total	21,305	100.0

Overall, these estimates suggest that more than 60 percent of the projected increase in net employment will be filled by individuals with at least some college as their highest level of educational attainment.⁵ Indeed, this figure is most likely an underestimate, because the assignment

⁵ This estimate is not an estimate of the percentage of jobs that will "require" at least some college. The concept that a job requires a specific level of educational attainment is related to the employers' demands for workers of various training and educational backgrounds. BLS projections of employment reflect equilibrium in the labor market—that is, the interplay between employer requirements for hiring workers and the skills and backgrounds of potential employees. Depending on labor market conditions, employer hiring requirements may change over time—a fact that is consistent with the substantial number of mixture occupations identified in the education cluster analysis. More importantly, the data used to estimate employment change reflect only the outcomes of those hiring decisions and provide no information on the job requirements of posted vacancies.

method described assumes no educational upgrading over the projection period.

In contrast to the foregoing results, using the 11 education/training categories set forth earlier results in a very different education profile for projected employment change. Assigning all of the employment in occupations falling into categories 1–7 to some college or more (including a bachelor’s degree and higher) results in only 42 percent of projected employment falling into this education classification (results not shown in table).

What will be the high-demand occupations over the 2002–12 projection period?

Obviously, the answer to this question depends critically on the definition of a high-demand occupation. One common approach is to identify a high-demand occupation with those occupations projected to grow the fastest over the projection period. Another is to sort occupations on the basis of their projected net increase in employment. Yet another is to limit the analysis to the fastest-growing occupations that are each projected to have numerical increases above some predetermined threshold. The latter approach is often used to exclude occupations with very small employment levels in the base year that show a large percentage increase, but contribute only a small number of jobs.

This section adopts a decidedly different approach by combining an employment growth criterion with a wage threshold criterion, the latter reflecting the relative (dollar) values the labor market places on workers in alternative occupations. Specifically, high-demand occupations are defined as occupations that are expected to grow faster than average over the 2002–12 projection period and that had median earnings in the top half of the 2002 distribution of earnings in the OES survey conducted that year. These occupations are sorted by the education clusters defined earlier. Certainly, there are numerous alternative criteria that can be used to define high-demand occupations, both in terms of changing the wage and employment growth cutoffs used or by including additional or alternative characteristics of occupations. The data provided in this issue of the OPTD gives analysts the ability to sort occupations on the basis of a number of alternative specifications.

Table I-4 offers a perspective on the relative contribution of each high-demand occupation to the total increase in net employment over the projection period. Consider, for example, employment in the last occupation listed in the table: mental health counselors. According to the second column, this occupation belongs to the education cluster containing college occupations. In 2002, mental health counselors had a total employment level of 85,000 (column 3) and median annual earnings of \$29,940 (column 4). Adding up the total employment in 2002 of all of the occu-

pations in the table up to and including mental health counselors, these occupations accounted for a cumulative 28.9 percent of the total employment in that year (column 5).

Employment of mental health counselors is projected to have a net employment increase of 23,000 (column 6) over the projections period, representing a 26.6-percent change over the period (column 7). Adding up the projected employment increase of all occupations in the table up to and including mental health counselors, these high-demand, high-wage occupations are projected to account for a cumulative 46.3 percent of the total projected employment increase over the 2002–12 period (column 8).

Table I-4 lists a total of 206 occupations, of which 9 are high school occupations, 40 are “high school/some college occupations,” 1 is a pure “some college” occupation, 27 are “high school/some college/college” occupations, 63 are “some college/college” occupations, and 66 are college occupations. The high school occupations listed include several construction-related occupations. The “high school/some college” occupations include a large number of fields requiring the acquisition of technical knowledge related to repair, installation, and the operation of various types of equipment. The “high school/some college/college” occupations reflect a more diverse mix of skill requirements and include a large number of service-providing fields, especially sales related. Also listed in the table are a number of management-related occupations, as well as fields requiring highly technical levels of skills. The “some college/college” occupations include a significant number of health- and computer-related fields. Finally, the college occupations naturally reflect a broad mix of professional occupations that generally require at least a bachelor’s degree or higher.

Conclusion

This chapter of *Occupational Projections and Training Data* introduces a new analytical product that describes the educational attainment distribution of 25- to 44-year-olds in each of the 725 occupations for which BLS has projected employment for the 2002–12 period. These data provide important information that complements the most significant single source of postsecondary education or training assigned by BLS analysts to each occupation.

Educational clusters of occupations are developed using these new data on educational attainment. These educational clusters are used to estimate the projected number of jobs that will be filled by those with high school or less, some college, and those with a bachelor’s degree or higher. And finally, occupations that were high wage in 2002 and are projected to have faster than average employment growth between 2002 and 2012 are identified and sorted by these educational clusters.

Table I-4. Cumulative proportion of total 2002 employment and 2002–12 projected employment change accounted for by high-wage, high-growth occupations

(Employment in thousands)

2002 national employment matrix occupation	Educational attainment cluster ¹	2002 employment	2002 median annual earnings	Cumulative percentage of total 2002 employment accounted for by this and all previous occupations listed in this table	Employment change, 2002–12		Cumulative percentage of total projected employment change, 2002–12 accounted for by this and all previous occupations listed in this table
					Numeric	Percent	
47-2082 Tapers	HS	41	\$39,000	0.0	8	20.8	0.0
47-2171 Reinforcing iron and rebar workers	HS	29	36,740	.0	5	16.7	.1
47-2044 Tile and marble setters	HS	33	35,770	.1	9	26.5	.1
47-2081 Drywall and ceiling tile installers	HS	135	33,710	.2	29	21.4	.2
47-2041 Carpet installers	HS	82	32,590	.2	14	16.8	.3
47-4041 Hazardous materials removal workers	HS	38	32,460	.2	16	43.1	.4
47-2051 Cement masons and concrete finishers	HS	182	30,660	.4	47	26.1	.6
47-2181 Roofers	HS	166	30,180	.5	31	18.6	.7
47-2053 Terrazzo workers and finishers	HS	6	27,910	.5	1	15.2	.8
47-4021 Elevator installers and repairers	HS/SC	21	54,070	.5	4	17.1	.8
49-1011 First-line supervisors/managers of mechanics, installers, and repairers	HS/SC	444	47,580	.8	68	15.4	1.1
47-2111 Electricians	HS/SC	659	41,390	1.3	154	23.4	1.8
47-2221 Structural iron and steel workers	HS/SC	78	40,660	1.3	12	15.9	1.9
47-2152 Plumbers, pipefitters, and steamfitters	HS/SC	492	40,170	1.7	92	18.7	2.3
49-9052 Telecommunications line installers and repairers	HS/SC	167	39,640	1.8	31	18.8	2.5
53-1011 Aircraft cargo handling supervisors	HS/SC	9	37,220	1.8	1	15.6	2.5
17-3025 Environmental engineering technicians	HS/SC	19	36,850	1.8	5	28.4	2.5
33-2011 Fire fighters	HS/SC	282	36,230	2.0	58	20.7	2.8
49-3099 All other vehicle and mobile equipment mechanics, installers, and repairers	HS/SC	36	35,840	2.0	6	15.4	2.8
49-2099 All other electrical and electronic equipment mechanics, installers, and repairers	HS/SC	22	35,160	2.0	4	19.6	2.8
43-6012 Legal secretaries	HS/SC	264	35,020	2.2	50	18.8	3.0
49-9021 Heating, air conditioning, and refrigeration mechanics and installers	HS/SC	249	34,900	2.4	79	31.8	3.4
47-2211 Sheet metal workers	HS/SC	205	34,560	2.5	41	19.8	3.6
29-2054 Respiratory therapy technicians	HS/SC	26	34,130	2.6	9	34.2	3.6
51-9122 Painters, transportation equipment	HS/SC	50	33,550	2.6	9	17.5	3.7
51-8031 Water and liquid waste treatment plant and system operators	HS/SC	99	33,390	2.7	16	16.0	3.8
53-3032 Truck drivers, heavy and tractor-trailer	HS/SC	1,767	33,210	3.9	337	19.0	5.3
37-1012 First-line supervisors/managers of landscaping, lawn service, and groundskeeping workers	HS/SC	150	33,050	4.0	32	21.6	5.5
33-3012 Correctional officers and jailers	HS/SC	427	32,670	4.3	103	24.2	6.0
49-2098 Security and fire alarm systems installers	HS/SC	46	32,370	4.3	14	30.2	6.0
43-9031 Desktop publishers	HS/SC	35	31,620	4.3	10	29.2	6.1
47-2121 Glaziers	HS/SC	49	31,620	4.4	8	17.2	6.1
29-2061 Licensed practical and licensed vocational nurses	HS/SC	702	31,440	4.9	142	20.2	6.8
43-5011 Cargo and freight agents	HS/SC	59	31,410	4.9	9	15.5	6.8
29-2055 Surgical technologists	HS/SC	72	31,210	5.0	20	27.9	6.9
51-4192 Lay-out workers, metal and plastic	HS/SC	13	30,760	5.0	2	15.6	6.9
53-3021 Bus drivers, transit and intercity	HS/SC	202	29,580	5.1	31	15.2	7.1
27-2032 Choreographers	HS/SC	17	29,470	5.1	3	15.8	7.1
49-9042 Maintenance and repair workers, general	HS/SC	1,266	29,370	6.0	207	16.3	8.1
17-3031 Surveying and mapping technicians	HS/SC	60	29,230	6.0	14	23.2	8.1
49-9011 Mechanical door repairers	HS/SC	11	29,190	6.0	2	21.8	8.1
51-4121 Welders, cutters, solderers, and brazers	HS/SC	391	29,160	6.3	66	17.0	8.5
49-3051 Motorboat mechanics	HS/SC	22	29,050	6.3	4	18.3	8.5
47-2130 Insulation workers	HS/SC	53	28,930	6.4	8	15.8	8.5
49-9094 Locksmiths and safe repairers	HS/SC	23	28,430	6.4	5	21.0	8.5
37-1011 First-line supervisors/managers of housekeeping and janitorial workers	HS/SC	230	28,140	6.5	37	16.2	8.7
47-4071 Septic tank servicers and sewer pipe cleaners	HS/SC	18	27,940	6.6	4	21.2	8.7
35-1011 Chefs and head cooks	HS/SC	132	27,940	6.7	21	15.8	8.8
51-9082 Medical appliance technicians	HS/SC	14	27,680	6.7	2	16.1	8.8
11-1021 General and operations managers	HS/SC/C	2,049	68,210	8.1	376	18.4	10.6

See footnotes at end of table.

Table I-4. Cumulative proportion of total 2002 employment and 2002–12 projected employment change accounted for by high-wage, high-growth occupations—Continued

(Employment in thousands)

2002 national employment matrix occupation	Educational attainment cluster ¹	2002 employment	2002 median annual earnings	Cumulative percentage of total 2002 employment accounted for by this and all previous occupations listed in this table	Employment change, 2002–12		Cumulative percentage of total projected employment change, 2002–12 accounted for by this and all previous occupations listed in this table
					Numeric	Percent	
11-3071 Transportation, storage, and distribution managers ...	HS/SC/C	111	\$59,660	8.2	22	19.7	10.7
41-4011 Sales representatives, wholesale and manufacturing, technical and scientific products	HS/SC/C	398	55,740	8.4	77	19.3	11.1
11-3011 Administrative services managers	HS/SC/C	321	52,500	8.7	63	19.8	11.4
13-1051 Cost estimators	HS/SC/C	188	47,550	8.8	35	18.6	11.5
29-2091 Orthotists and prosthetists	HS/SC/C	5	46,260	8.8	1	18.9	11.5
33-1011 First-line supervisors/managers of correctional officers	HS/SC/C	33	44,940	8.8	6	19.0	11.6
13-2099 All other financial specialists	HS/SC/C	162	44,140	8.9	28	17.6	11.7
33-3052 Transit and railroad police	HS/SC/C	6	43,710	8.9	1	15.9	11.7
39-6031 Flight attendants	HS/SC/C	104	43,140	9.0	17	16.0	11.8
41-4012 Sales representatives, wholesale and manufacturing, except technical and scientific products	HS/SC/C	1,459	42,730	10.0	279	19.2	13.1
29-1031 Dietitians and nutritionists	HS/SC/C	49	41,170	10.1	9	17.8	13.1
19-4092 Forensic science technicians	HS/SC/C	8	41,040	10.1	2	18.9	13.1
25-2012 Kindergarten teachers, except special education	HS/SC/C	168	39,810	10.2	46	27.2	13.4
39-1011 Gaming supervisors	HS/SC/C	39	39,290	10.2	6	15.7	13.4
27-4014 Sound engineering technicians	HS/SC/C	13	36,970	10.2	3	25.5	13.4
27-2042 Musicians and singers	HS/SC/C	161	36,290	10.3	27	17.1	13.5
19-4091 Environmental science and protection technicians, including health	HS/SC/C	28	35,320	10.3	10	36.8	13.6
41-9098 All other sales and related workers	HS/SC/C	577	35,170	10.7	140	24.3	14.2
33-1099 All other first-line supervisors/managers, protective service workers	HS/SC/C	56	34,320	10.8	13	23.9	14.3
19-4098 All other life, physical, and social science technicians	HS/SC/C	137	34,030	10.9	24	17.5	14.4
27-2099 All other entertainers and performers, sports and related workers	HS/SC/C	56	33,740	10.9	9	16.4	14.5
49-2011 Computer, automated teller, and office machine repairers	HS/SC/C	156	33,250	11.0	24	15.0	14.6
19-4021 Biological technicians	HS/SC/C	48	32,710	11.1	9	19.4	14.6
29-9199 All other health practitioners and technical workers	HS/SC/C	190	31,690	11.2	52	27.2	14.8
27-4011 Audio and video equipment technicians	HS/SC/C	42	31,110	11.2	11	26.8	14.9
43-4161 Human resources assistants, except payroll and timekeeping	HS/SC/C	174	30,410	11.3	33	19.2	15.1
31-2011 Occupational therapist assistants	SC	18	36,660	11.4	7	39.2	15.1
11-1011 Chief executives	SC/C	553	126,260	11.7	93	16.8	15.5
11-3021 Computer and information systems managers	SC/C	284	85,240	11.9	103	36.1	16.0
11-2021 Marketing managers	SC/C	203	78,250	12.1	43	21.4	16.2
15-1011 Computer and information scientists, research	SC/C	23	77,760	12.1	7	30.0	16.2
11-2022 Sales managers	SC/C	343	75,040	12.3	105	30.5	16.7
11-3031 Financial managers	SC/C	599	73,340	12.7	109	18.3	17.2
11-3040 Human resources managers	SC/C	202	64,710	12.9	39	19.4	17.4
29-1071 Physician assistants	SC/C	63	64,670	12.9	31	48.8	17.6
15-1051 Computer systems analysts	SC/C	468	62,890	13.3	184	39.4	18.4
11-9111 Medical and health services managers	SC/C	244	61,370	13.4	71	29.3	18.8
33-1012 First-line supervisors/managers of police and detectives	SC/C	114	61,010	13.5	17	15.2	18.9
15-1081 Network systems and data communications analysts	SC/C	186	58,420	13.6	106	57.0	19.4
11-2011 Advertising and promotions managers	SC/C	85	57,130	13.7	21	25.0	19.5
15-1061 Database administrators	SC/C	110	55,480	13.8	49	44.2	19.7
33-1021 First-line supervisors/managers of fire fighting and prevention workers	SC/C	63	55,450	13.8	12	18.7	19.7
29-2021 Dental hygienists	SC/C	148	55,320	13.9	64	43.1	20.0
15-1071 Network and computer systems administrators	SC/C	251	54,810	14.1	94	37.4	20.5

See footnotes at end of table.

Table I-4. Cumulative proportion of total 2002 employment and 2002–12 projected employment change accounted for by high-wage, high-growth occupations—Continued

(Employment in thousands)

2002 national employment matrix occupation	Educational attainment cluster ¹	2002 employment	2002 median annual earnings	Cumulative percentage of total 2002 employment accounted for by this and all previous occupations listed in this table	Employment change, 2002–12		Cumulative percentage of total projected employment change, 2002–12 accounted for by this and all previous occupations listed in this table
					Numeric	Percent	
15-1099 All other computer specialists	SC/C	192	\$54,070	14.2	70	36.5	20.8
33-3021 Detectives and criminal investigators	SC/C	94	51,410	14.3	21	22.4	20.9
13-1198 All other business operations specialists	SC/C	1,056	50,680	15.0	290	27.5	22.3
29-1124 Radiation therapists	SC/C	14	50,640	15.0	4	31.6	22.3
27-3042 Technical writers	SC/C	50	50,580	15.1	13	27.1	22.4
29-2033 Nuclear medicine technologists	SC/C	17	48,750	15.1	4	23.6	22.4
29-2032 Diagnostic medical sonographers	SC/C	37	48,660	15.1	9	24.0	22.4
29-1111 Registered nurses	SC/C	2,284	48,090	16.7	623	27.3	25.3
27-2012 Producers and directors	SC/C	76	46,240	16.7	14	18.2	25.4
27-2021 Athletes and sports competitors	SC/C	15	45,320	16.7	3	19.2	25.4
13-1072 Compensation, benefits, and job analysis specialists	SC/C	91	45,100	16.8	25	28.0	25.5
13-2072 Loan officers	SC/C	223	43,980	17.0	42	18.8	25.7
27-1014 Multi-media artists and animators	SC/C	75	43,980	17.0	12	15.8	25.8
13-1061 Emergency management specialists	SC/C	11	43,560	17.0	3	28.2	25.8
29-2011 Medical and clinical laboratory technologists	SC/C	150	42,910	17.1	29	19.3	25.9
13-2041 Credit analysts	SC/C	66	42,910	17.2	12	18.7	26.0
13-1073 Training and development specialists	SC/C	209	42,800	17.3	58	27.9	26.3
33-3051 Police and sheriff's patrol officers	SC/C	619	42,270	17.8	153	24.7	27.0
13-2021 Appraisers and assessors of real estate	SC/C	88	41,760	17.8	16	17.6	27.1
29-1126 Respiratory therapists	SC/C	86	40,220	17.9	30	34.8	27.2
13-1071 Employment, recruitment, and placement specialists	SC/C	175	39,410	18.0	48	27.3	27.4
27-1025 Interior designers	SC/C	60	39,180	18.0	13	21.7	27.5
15-1041 Computer support specialists	SC/C	507	39,100	18.4	153	30.3	28.2
29-2034 Radiologic technologists and technicians	SC/C	174	38,970	18.5	40	23.0	28.4
27-3099 All other media and communication workers	SC/C	58	38,680	18.5	10	17.2	28.4
27-4032 Film and video editors	SC/C	19	38,270	18.6	5	26.4	28.5
23-2011 Paralegals and legal assistants	SC/C	200	37,950	18.7	57	28.7	28.7
13-1121 Meeting and convention planners	SC/C	37	37,420	18.7	8	21.3	28.8
27-1024 Graphic designers	SC/C	212	36,680	18.9	46	21.9	29.0
29-2031 Cardiovascular technologists and technicians	SC/C	43	36,430	18.9	15	33.5	29.1
25-3011 Adult literacy, remedial education, and GED teachers and instructors	SC/C	80	36,400	19.0	16	20.4	29.1
21-1091 Health educators	SC/C	45	36,240	19.0	10	21.9	29.2
31-2021 Physical therapist assistants	SC/C	50	36,080	19.0	22	44.6	29.3
53-2022 Airfield operations specialists	SC/C	6	36,010	19.0	1	17.2	29.3
27-1013 Fine artists, including painters, sculptors, and illustrators	SC/C	23	35,260	19.0	4	16.5	29.3
27-4099 All other media and communication equipment workers	SC/C	24	34,680	19.1	5	20.1	29.3
27-1027 Set and exhibit designers	SC/C	12	33,870	19.1	3	20.9	29.3
27-3091 Interpreters and translators	SC/C	24	32,590	19.1	5	22.0	29.4
13-2071 Loan counselors	SC/C	31	32,010	19.1	6	17.8	29.4
25-3021 Self-enrichment education teachers	SC/C	200	29,320	19.2	80	40.1	29.8
33-9021 Private detectives and investigators	SC/C	48	29,300	19.3	12	25.3	29.8
25-3999 All other teachers, primary, secondary, and adult	SC/C	679	29,250	19.8	229	33.7	30.9
29-2012 Medical and clinical laboratory technicians	SC/C	147	29,040	19.9	29	19.4	31.0
31-9011 Massage therapists	SC/C	92	28,610	19.9	25	27.0	31.1
21-2021 Directors, religious activities and education	SC/C	105	28,020	20.0	25	24.1	31.3
27-2022 Coaches and scouts	SC/C	130	27,880	20.1	24	18.3	31.4
29-1060 Physicians and surgeons	C	583	145,600	20.5	114	19.5	31.9
53-2011 Airline pilots, copilots, and flight engineers	C	79	109,580	20.5	15	18.5	32.0
29-1081 Podiatrists	C	13	94,870	20.6	2	15.0	32.0
23-1011 Lawyers	C	695	90,290	21.0	118	17.0	32.5
29-1041 Optometrists	C	32	86,090	21.1	5	17.1	32.6

See footnotes at end of table.

Table I-4. Cumulative proportion of total 2002 employment and 2002–12 projected employment change accounted for by high-wage, high-growth occupations—Continued

(Employment in thousands)

2002 national employment matrix occupation		Educational attainment cluster ¹	2002 employment	2002 median annual earnings	Cumulative percentage of total 2002 employment accounted for by this and all previous occupations listed in this table	Employment change, 2002–12		Cumulative percentage of total projected employment change, 2002–12 accounted for by this and all previous occupations listed in this table
						Numeric	Percent	
29-1051	Pharmacists	C	230	\$77,050	21.2	69	30.1	32.9
15-1032	Computer software engineers, systems software	C	281	74,040	21.4	128	45.5	33.5
11-9032	Education administrators, elementary and secondary school	C	217	71,490	21.6	45	20.7	33.7
15-1031	Computer software engineers, applications	C	394	70,900	21.8	179	45.5	34.5
15-2011	Actuaries	C	15	69,970	21.8	2	14.9	34.6
29-1011	Chiropractors	C	49	65,330	21.9	11	23.3	34.6
11-9033	Education administrators, postsecondary	C	125	64,640	22.0	32	25.9	34.8
19-3032	Industrial-organizational psychologists	C	2	63,710	22.0	0	16.0	34.8
41-9031	Sales engineers	C	82	63,660	22.0	16	19.9	34.8
29-1131	Veterinarians	C	58	63,090	22.1	14	25.1	34.9
17-2081	Environmental engineers	C	47	61,410	22.1	18	38.2	35.0
11-2031	Public relations managers	C	69	60,640	22.1	16	23.4	35.1
17-2031	Biomedical engineers	C	8	60,410	22.2	2	26.1	35.1
19-1021	Biochemists and biophysicists	C	17	60,390	22.2	4	22.9	35.1
13-1111	Management analysts	C	577	60,340	22.6	176	30.4	35.9
19-2021	Atmospheric and space scientists	C	8	60,200	22.6	1	16.2	35.9
11-9039	Education administrators, all other	C	27	57,840	22.6	5	19.1	36.0
29-1123	Physical therapists	C	137	57,330	22.7	48	35.3	36.2
13-2051	Financial analysts	C	172	57,100	22.8	32	18.7	36.3
19-1042	Medical scientists, except epidemiologists	C	58	56,980	22.8	16	26.9	36.4
13-2052	Personal financial advisors	C	126	56,680	22.9	44	34.6	36.6
17-1011	Architects, except landscape and naval	C	113	56,620	23.0	20	17.2	36.7
19-2043	Hydrologists	C	8	56,530	23.0	2	21.0	36.7
13-1011	Agents and business managers of artists, performers, and athletes	C	15	55,730	23.0	4	27.8	36.7
19-1041	Epidemiologists	C	4	53,840	23.0	1	32.5	36.7
19-3021	Market research analysts	C	134	53,810	23.1	31	23.4	36.9
19-3092	Geographers	C	1	53,420	23.1	0	19.5	36.9
19-1029	Biological scientists, all other	C	27	53,300	23.1	6	22.3	36.9
29-1198	All other health diagnosing and treating practitioners	C	107	52,430	23.2	26	24.5	37.0
29-1122	Occupational therapists	C	82	51,990	23.3	29	35.2	37.2
19-3031	Clinical, counseling, and school psychologists	C	137	51,170	23.4	34	24.4	37.3
19-1022	Microbiologists	C	16	51,020	23.4	3	20.0	37.3
29-1127	Speech-language pathologists	C	94	49,450	23.4	26	27.2	37.5
25-1000	Postsecondary teachers	C	1,581	49,090	24.5	603	38.1	40.3
29-1121	Audiologists	C	11	48,400	24.5	3	29.0	40.3
53-2012	Commercial pilots	C	21	47,970	24.6	3	14.9	40.3
19-2041	Environmental scientists and specialists, including health	C	65	47,600	24.6	15	23.7	40.4
17-1012	Landscape architects	C	23	47,400	24.6	5	22.2	40.4
25-9031	Instructional coordinators	C	98	47,350	24.7	25	25.4	40.5
13-2011	Accountants and auditors	C	1,055	47,000	25.4	205	19.5	41.5
19-1099	All other life scientists	C	26	46,140	25.4	5	18.3	41.5
21-1012	Educational, vocational, and school counselors	C	228	44,100	25.6	34	15.0	41.7
25-2031	Secondary school teachers, except special and vocational education	C	988	43,950	26.3	180	18.2	42.5
25-2040	Special education teachers	C	433	43,450	26.6	130	30.0	43.1
11-9151	Social and community service managers	C	129	43,080	26.7	36	27.7	43.3
17-1021	Cartographers and photogrammetrists	C	9	42,870	26.7	1	15.1	43.3
27-3043	Writers and authors	C	139	42,790	26.8	22	16.1	43.4
25-2021	Elementary school teachers, except special education	C	1,467	41,780	27.8	223	15.2	44.5
27-3031	Public relations specialists	C	158	41,710	27.9	52	32.9	44.7
21-1022	Medical and public health social workers	C	107	37,380	28.0	31	28.6	44.8

See footnotes at end of table.

Table I-4. Cumulative proportion of total 2002 employment and 2002–12 projected employment change accounted for by high-wage, high-growth occupations—Continued

(Employment in thousands)

2002 national employment matrix occupation	Educational attainment cluster ¹	2002 employment	2002 median annual earnings	Cumulative percentage of total 2002 employment accounted for by this and all previous occupations listed in this table	Employment change, 2002–12		Cumulative percentage of total projected employment change, 2002–12 accounted for by this and all previous occupations listed in this table
					Numeric	Percent	
21-1013 Marriage and family therapists	C	23	\$35,580	28.0	5	22.4	44.9
25-4010 Archivists, curators, and museum technicians	C	22	35,270	28.0	4	17.0	44.9
29-9091 Athletic trainers	C	14	33,820	28.0	4	29.9	44.9
11-9031 Education administrators, preschool and child care center/program	C	58	33,340	28.1	19	32.0	45.0
21-1021 Child, family, and school social workers	C	274	33,150	28.3	64	23.2	45.3
21-2011 Clergy	C	400	33,110	28.5	62	15.5	45.6
21-1023 Mental health and substance abuse social workers ...	C	95	32,850	28.6	33	34.5	45.7
25-9011 Audio-visual collections specialists	C	10	32,360	28.6	2	16.3	45.7
21-9099 All other counselors, social, and religious workers	C	248	31,150	28.8	70	28.3	46.1
21-1011 Substance abuse and behavioral disorder counselors	C	67	30,180	28.8	16	23.2	46.1
21-1014 Mental health counselors	C	85	29,940	28.9	23	26.6	46.3

¹ The job types are presented in the following categories: HS = high school occupations, HS/SC = high school/some college occupations, SC = some college occupations, HS/SC/C = high school/some college/college

occupations, SC/C = some college/college occupations, and C = college occupations. For additional information on educational attainment cluster methodology, see text of this chapter and Table I-1.

Educational upgrading of occupations: A sensitivity analysis

The choice of 25- to 44-year-olds as the basis for assigning educational attainment distributions to each occupation can affect the education cluster assigned to each occupation. If there has been an increase in the average level of educational attainment in the Nation over time, then one may expect that occupations will sort into higher education clusters as the age group that is used to define the clusters is limited to younger workers. For example, an occupation that is classified as “high school/some college” for the group of workers aged 25 years and older may end up classified as “some college/college” for workers aged 25 to 44 years. This section reports the sensitivity of the assignments of occupations to education clusters for three groups of workers: those aged 25 years and older, those aged 25-44, and those aged 25 to 34 years. The educational attainment of those in CPS-coded occupations for the period 2000–02 is used for the analysis, with occupations having a weighted employment of less than 10,000 excluded.

The accompanying text table presents the results. There were 331 CPS-coded occupations with a weighted employment of 10,000 or greater for each of the three age groups. The text presents a side-by-side comparison of differences that emerged between the education cluster assignments for the 25-years-and-older age group with those for the 25- to 44-year-old age group. The table is sorted first by the education cluster of occupations in the 25-years-and-older group and then by the education cluster of occupations in the 25- to 44-year-old group. A total of 20 occupations moved into an education cluster that represents a higher average level of overall educational attainment. By contrast, only four occupations moved into a lower education cluster. The table also presents similar results comparing the education cluster assignments for the 25-years-and-older age group with those for the 25- to 34-year-old age group. A total of 41 occupations moved into a higher education cluster. Comparing the two tables, one finds that a net 21 additional occupations out of a total of 331 moved into a higher education cluster as the age group was restricted from 25- to 44-year olds to 25- to 34-year-olds.

Number of occupations falling into education clusters for CPS-based occupations, 2000–02, by selected age groups

25 and older	25-44 years of age					
	High school	High school/some college	Some college	High school/some college/college	Some college/college	College
High school	44	5	0	0	0	0
High school/some college	1	121	0	3	0	0
Some college	0	0	0	0	0	0
High school/some college/college	1	2	0	52	6	0
Some college/college	0	0	0	0	44	6
College	0	0	0	0	0	46
25 and older	25-34 years of age					
	High school	High school/some college	Some college	High school/some college/college	Some college/college	College
High school	40	9	0	0	0	0
High school/some college	1	119	5	0	0	0
Some college	0	0	0	0	0	0
High school/some college/college	0	1	0	42	18	0
Some college/college	0	0	0	2	39	9
College	0	0	0	0	0	46

These differences point to the educational upgrading of a number of occupations over time as the age group under analysis is restricted from those 25 and older to those 25 to 44 years and then to those 25 to 34 years of age. The choice of using 25- to 44-year-olds as the basis for defining educational attainment distributions of occupations reflects the balance of concern over the educational upgrading phenomenon and over adequately capturing individuals in management occupations. Restricting the analysis to 25- to 34-year-olds would miss significant numbers of individuals entering this major occupational group. Using the combined 2000–02 CPS data indicates that 18.7 percent of managers were ages 25 to 34 years, while 30.4 percent were in the 35- to 44-year age group.

The conclusion that there has been a general upgrading of educational requirements in a number of occupations over time also is a conservative one in the sense that only those occupations which crossed either the 20-percent or the 60-percent thresholds for high school or less, some college, or bachelor’s degree or higher are candidates for the list of occupations in the accompanying tables. Any educational upgrading that has occurred within education clusters is not identified. However, the purpose of this sensitivity analysis is to determine the efficacy of the choice of education clusters, not to measure the heterogeneity within each cluster. An analysis of this more general phenomenon awaits further research.